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Market dominance of GAFA companies and challenges posed to competition policy

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1. Introduction

With the innovation brought by digital transformation and the so called “Big Data era” a need for changes is demanded, with greater concern over the consequences that the growing power of digital companies could provoke. Online platforms became very big in the last ten years, with a speed rate of growth without precedents and they became part of people’s everyday life thanks to their being economically convenient and accessible by everyone has an Internet connection. While in US the problem is still unseen or underestimated because of their Schumpetarian “lasseiz-faire” approach to competition, EU Commission in the last years is actively moving to reestablish fair competition, by acting against some major digital platforms (Google was particularly targeted), introducing new regulations to protect users’ data (GDPR) and discussing about future steps.

The work focuses on online platforms in general and in particular on the four biggest online platforms known as GAFA: Google, Amazon, Facebook and Apple; the aim is to investigate how these companies were able to dominate their market and expand their domain into other adjacent markets too in a very short period of time, discussing whether they used or are using anticompetitive instruments to do so and whether their exponential growth brings competition issues or problems of other nature.

The first chapter will give an overall picture of online platforms and of the market in which these companies operate, that is generally a two-sided or a multi-sided market, explaining the peculiarities of these markets; it will analyze the main characteristics of online platforms, in order to explore how they acquired dominance in a very small period of time.

The second chapter will focus on GAFA companies, their history and the business model that lead each of the four giants to success.

In the third chapter a description of the Antitrust authorities in US and UE will be provided; focusing on UE Antitrust, the chapter will continue picturing the regulatory framework along with the problems in applying it to digital platforms; then an analysis of various cases opened against GAFA companies will follow.

The fourth chapter will go into further details in our evaluation and it will explore the “weapons” online platforms can exploit to be dominant avoiding scrutiny at the same time. After a general assessment, two case studies will be investigated as example.

The last chapter aims to propose and discuss potential solutions through analyses collected from different sources, outlining problems and possible outcomes for every solution. The entire regulatory framework will be put into discussion and a list of the players that have a role in the future of digital economy regulation will be provided.

2. Digital platform companies

The acronym GAFA refers to the four largest US digital platforms companies that controls a big part of the market: Google, Amazon, Facebook and Apple. They operate mostly in multi-sided markets. When it comes to competition policy issues and the maximizing profit calculus these markets are more complex than traditional businesses. These four digital companies grew quickly in the last years, reaching a position of dominance in their markets and determining the digitalization of the economy. In this chapter we analyze multi-sided markets, focusing, for the sake of simplicity in two-sided markets.

2.1 Two-sided markets

Online platforms operate in multi-sided or two-sided markets, and for this reason many refer to them as two-sided platforms. Two-sided markets have two user groups that produce network benefits for each other: they interact through a platform that intermediate between them and the decisions of a group have an impact on the outcomes of the other. Evans [1] gives us a definition of a two-sided platform like a platform that "*provides goods or services to two distinct groups of customers who need each other in some way and who rely on the platform to intermediate transactions between them. Two-sided platforms minimize transactions costs between entities that can benefit from getting together, permitting value-creating exchanges to take place that would not occur otherwise".*[1] Two-sided platforms provide a virtual or a physical meeting place for the two groups, reducing to the minimum the transaction costs they would pay if they act on their own. For example, a type of two-sided market is the advertisement-based media: the platform gives to his users a service and connect them with advertisers. His main purpose is, indeed, to create audience. Google and Facebook are advertisement-based media, they make profits with the ads on their websites when a user click on them, and they succeed by having a big number of users through a free service offering, online research and social media respectively. Amazon provide a virtual place where sellers and buyers can reach each other with a reduced cost. Another example: credit cards make possible a transaction between a costumer and a merchant.

2.1.1 Pricing

The peculiarity of these markets is that the growth of users of one side increases the value offered to the other side - these are called **indirect network effects –** and the value offered to the users increases if the numbers of users grows – **direct network effects**. More users on Facebook means more possibility to click on ads and more targets for the advertisement's company (indirect); at the same time the utility of the social network increases if more people that a user wants to contact are joining it (direct). Evans notice how "*to establish a two-sided platform, the founders must solve the 'chicken-and-egg problem': customers on side A will not participate without customers on side B while customers on side B will not participate without customers on side A. The founders must be able to make credible commitments to one side that if they show up at the platform, the other side will be there as well.*" [1] This means that the initial costs to develop a two-sided platform are really high.

Pricing with two-sided markets is not the same as in traditional markets. The price-cost mark up in two-sided markets can't be fixed only considering the elasticity of demand and the marginal costs,

since the interdependence between the two markets has to be considered: the mark up should take into account the elasticity of demand of both sides and the interaction between them, the cost attributable to each side and the cost to run the platform.
These markets can be competitive even if the price structure doesn't reflect relative costs: since the platform can earn profits from both sides it can offer prices below incremental costs – even free services– to one side. This side is the one with the better deal and is usually more difficult to reach. The platform gives this side a free service with the aim to attract enough audience to give value to the other side. Internet users don't pay to make searches on Google, while advertisers pay to put their ads on the website. According to this, an increase in costs on the "better deal" side would mean an increased price for the other side while the price for the first one wouldn't change at all; this is the reason why is not possible to use traditional economic models with two-sided platforms. The competitive price isn't the one that equals marginal costs, but it is far less for the "better deal" side, since the pricing model differs from the traditional one.

Let's consider the demand curve of both markets – consumers C and developers J - where the consumer demand is the most price sensitive. With the traditional pricing logic, we don't take into account the network effects, so the profit maximization implies seeking the biggest rectangle area given by the multiplication between price and quantity. Considering marginal costs negligible, the total profit in this model would be the sum of the profit of each market:

$$\pi = \pi_c + \pi_j = p_c q_c + p_j q_j \qquad (2.1)$$

However, the demand curves are not fixed: if we consider network effects, the developer demand curve shifts outward – because it increases - depending on the growth of the audience in the other market. Let's consider the network effects e_{jc} and e_{cj}, respectively how much effect the growth of developer market has on the consumer market and vice versa, and the demand curves linear. The demand curves integrated with the externalities can be described with the equations

$$q_c = D_c(p_c) + e_{jc} D_j(p_j); \qquad (2.2)$$

$$q_j = D_j(p_j) + e_{cj} D_c(p_c); \qquad (2.3)$$

We define the exogenous parameters Q_c and $Q_j$as the maximum market sizes and V_c and V_j as the maximum product value in absence of externalities in the market C and J respectively. V_i with $i \in (c, j)$ is the price that the consumers and developers would be willing to pay for one discrete unit of good. We represented for simplicity as linears the demand curves of the two markets and with simple equations:

$$D_c(p_c) = Q_c(1 - p_c/V_c) \qquad (2.4)$$

$$D_j(p_j) = Q_j(1 - p_j/V_j) \qquad (2.5)$$

In Image 2.1 we consider the effect of an externality of the market J (network effects) on the market C. As we can see, the demand curve in the market C shifts: the value raises from V_c to $V_c(1 + e_{jc}(Q_j/Q_c)\,(1 - p_j/V_j))$ and the size grows from Q_c to $Q_c + e_{jc}Q_j(1 - p_j/V_j)$

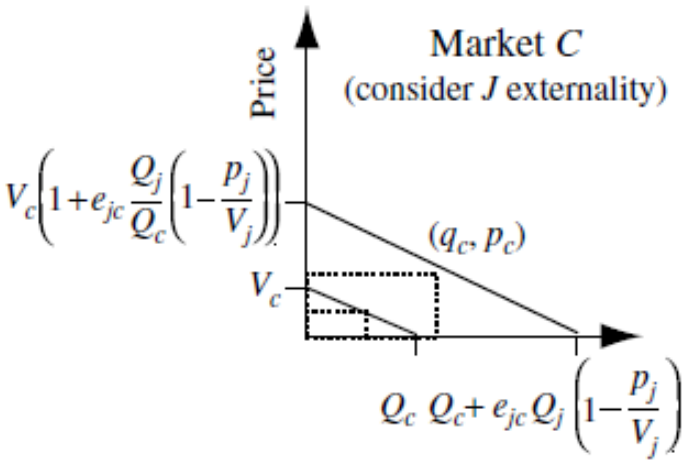

Image 2.1 In a two-sided market, an externality (network effect) from the market J shifts the demand curve up in the market C. [2]

Thanks to network effects, the demand curve shifted and the optimal independent pair (qc,pc) in the market C increased. We will analyze now how a monopoly platform take advantage of this effect.

To understand the pricing structure of two-sided markets with the presence of a monopoly, we define p* as the optimal monopoly price in coordinated two-sided markets and p° as the price without network effects. The prices are differents between each other unless $e_{jc} = e_{cj} = 0$.

We can see in Image 2.2 how the monopoly platform can raise the price from p_j° to p_j^* for developers and offering an almost free price to consumers, lowering the price for them from p_c° to p_c^*: this is profitable for the company as long as the new profit area in Market J is bigger than the loss given by the new lowered price in Market C. Increasing p_j, anyway, reduces the total shifts of the demand curve in the market C that we observed in Image 2.1.

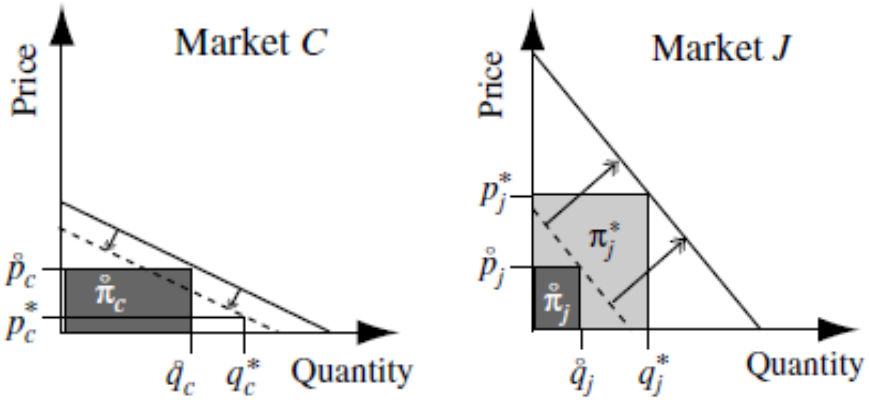

Image 2.2 Pricing model of a two-sided market with and without considering network effects with a monopoly. [2]

We can conclude that this pricing model implies that the more the monopolist is able to attract audience (consumers in the market C), the more it can charge the developers in the market J and increment its profits: as long as the profits' increment is higher than the loss in the other market, the monopolist is able to offer a free or almost free price to the consumers while making profits. More in general, the choiche of which market to subsidize between market C and market J depends on the characteristics of the network effects. In particular, the externality (network effect) of market J to market C is given by $dq_j/dp_c = e_{cj}D_c'(p_c)$, we can call this spillover effect and we can define the ratio

$$r = (dq_j/dp_c)/\,(dq_c/dp_j) \qquad (2.6)$$

The monopoly chose which platform to subsidize basing on the value of the ratio r.

In the case we studied before we have **asymmetric externalities**, that means that $r < 1$ and network effects are stronger, in our example, from market C to market J than vice versa. In fact, in our study market C was the market to subsidize and the monopolist set $p_c^* < p_c^\circ$ and $p_j^* > p_j^\circ$.

If we have **simmetric externalities,** then $r = 1$ and the prices are independent from the network effect. The monopolist set the prices p_i^* with $i \in (c, j)$ that are always $p_i^* \leq p_i^\circ$ less than in the case of non-externalities since it continues exploiting the presence of network effects while both market are charged positive prices.

2.1.2 Surplus

The ability of monopoly platforms to exploit the externalities to make profits lead to wonder whether it is a gain or a loss for the consumer. We can analyze the effect on the **consumer surplus**: the consumer surplus is defined as the difference between the price the consumer would be willing to pay and the price he actually pay. To understand if the surplus grows in a presence of a monopoly platform, we consider two cases: the first with a monopoly platform integrating a two-sided market and the second with two independent firms for the two markets.

In the presence of simmetric externalities, we know that $p_i^* \leq p_i^\circ$ with $i \in (c, j)$ so it is easy to conclude that also $CS_i^* \geq CS_i^\circ$ and we drive to the conclusion that consumer surplus grows in two-sided markets under monopoly ownership with simmetric network effects. If the network effects are not simmetric, the situation is more ambiguous. The subsidized size benefits from the lower prices and the consumer surplus grows in this market, but in the other one happens the opposite. The total result depend from the type of demand curve: anyway, in the case we studied, with linear demand curves, the result is an improvement of the sum of the consumer surplus in the two markets. In this particular case, even with asymmetric externalities, $CS_c^* + CS_j^* \geq CS_c^\circ + CS_j^\circ$.

From the producer perspective, the monopolist is always able to set the price, then $\pi_j^* \geq \pi_j^\circ$, the **producer surplus** grows and total welfare Pareto improves.

It must be taken into account that these results don't consider the fact that the subsidized side of the two-sided market often pays a non-monetizable price in terms of the data it provides to the

monopoly platform. A more detailed model should include this element and the consumer surplus should be analyzed from this perspective.

2.1.2 Examples

The described model is applied to different product category, some of them reported in Table 2.1. As we discussed, the Consumer Market is the subsidized one and the Developer Market is the one charged. All four GAFA companies can be found among these examples.

Table 2.1. Examples of two-sided markets. [2]

Product category	**Market 1 (Consumers Market)**	**Market 2 (Developers Market)**	**Intermediary**
Online search	Searchers	Advertisers	**Google**
Credit cards	Consumer credit	Merchant processing	MasterCard
Auctions	Buyers	Sellers	eBay, **Amazon**
Social Network	Members	Advertisers	**Facebook**
Operating System	Complementary applications	System developer toolkits	**Apple,** Microsoft

2.2 Types of online platforms

The most common characteristic of platform companies is the exploitation of direct and indirect network effects. In fact, network effects lead to market concentration because as a platform grows, it becomes more difficult for competitors to challenge its position. In these markets the first-mover advantage can become critical and result in a winner-takes-all outcome. Moreover, being "online" platforms has other implications since data-driven markets have particular characteristics. There are four main types of online platform, where we can classify GAFA companies. In this section we will discuss the characteristics of digital platforms and analyze each type.

2.2.1 Types of platforms' business models

As Image 2.3 shows, digital platforms' business models can be categorized basing on the market they operate in and the network effects: (1) single-sided platforms without network effects, (2) single-sided platforms with direct network effects, (3) multi-sided platforms with indirect network effects and (4) multi-sided platforms with both direct and indirect network effects.

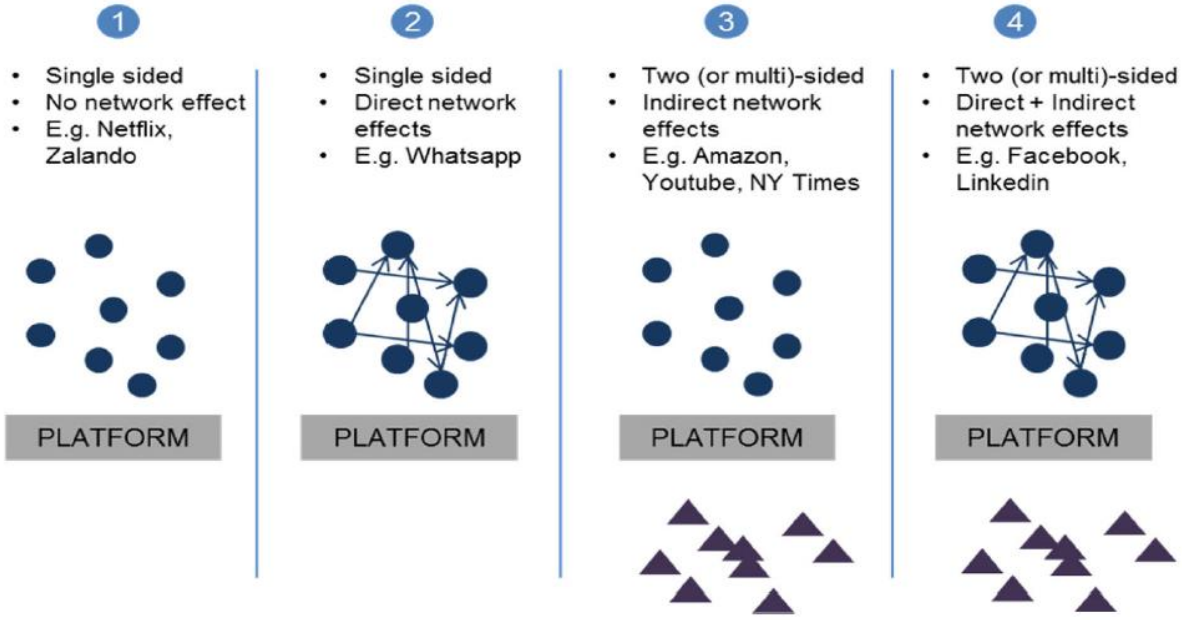

Image 2.3. Digital platforms' business models based on network effects. [80]

Platforms, anyway, can change business model over time: for example, Netflix is in the category (1) but it could decide to exploit scale opening its platform to advertisers and become (3) type, or it could allow users to interact maybe through a chat feature, becoming (2) type.

Putting aside network effects and markets and considering the revenues' categorization, there are three principal types of platform's business models [3,4]:

1. The **pay/subscription model**, where the platform charges users for its service (as Netflix, that offer a video-stream catalog of movies and TV series for a low monthly price, Amazon Prime, ...)
2. The **advertisement model**, where the platform offers a free service to users, that provide revenues indirectly, by being exposed to ads and by giving their data to be used by the platform to improve advertisement effectiveness (as Facebook, Google search, ...)
3. The **access model**, where the platform charges app and content developers for selling their product to users and offers access to users. Also users can be charged for a percentage of the sale revenue (as Apple Store, Google Play Store, Amazon Marketplace, iOS ...)

For example, Google and Facebook are advertisement-based platforms. While models of advertising platforms like DoubleClick before the acquisition by Google offered only this element, their advertisement model is based on three elements:

- The users' data is used to build profiles and audience segmentation that are offered to the advertising platform to improve the relevance of the ads showed to users (personalized ads)
- An advertising platform
- Web pages and apps where advertisements are shown

Google provides a free service (online research) along with other features (Mail, Map, YouTube online videos, ...), that attract consumers and create audience for advertisers: the company earns all his revenues from advertising. In fact, while offering services to users, Google in parallel offers advertising services to its ad partner companies and uses users' data collected with its wide range of applications to provide personalized advertisement to the same users. The advertisements to be displayed are selected and distributed by Google via DoubleClick, its advertising platform. In Image 2.3 Google's business model it is represented.

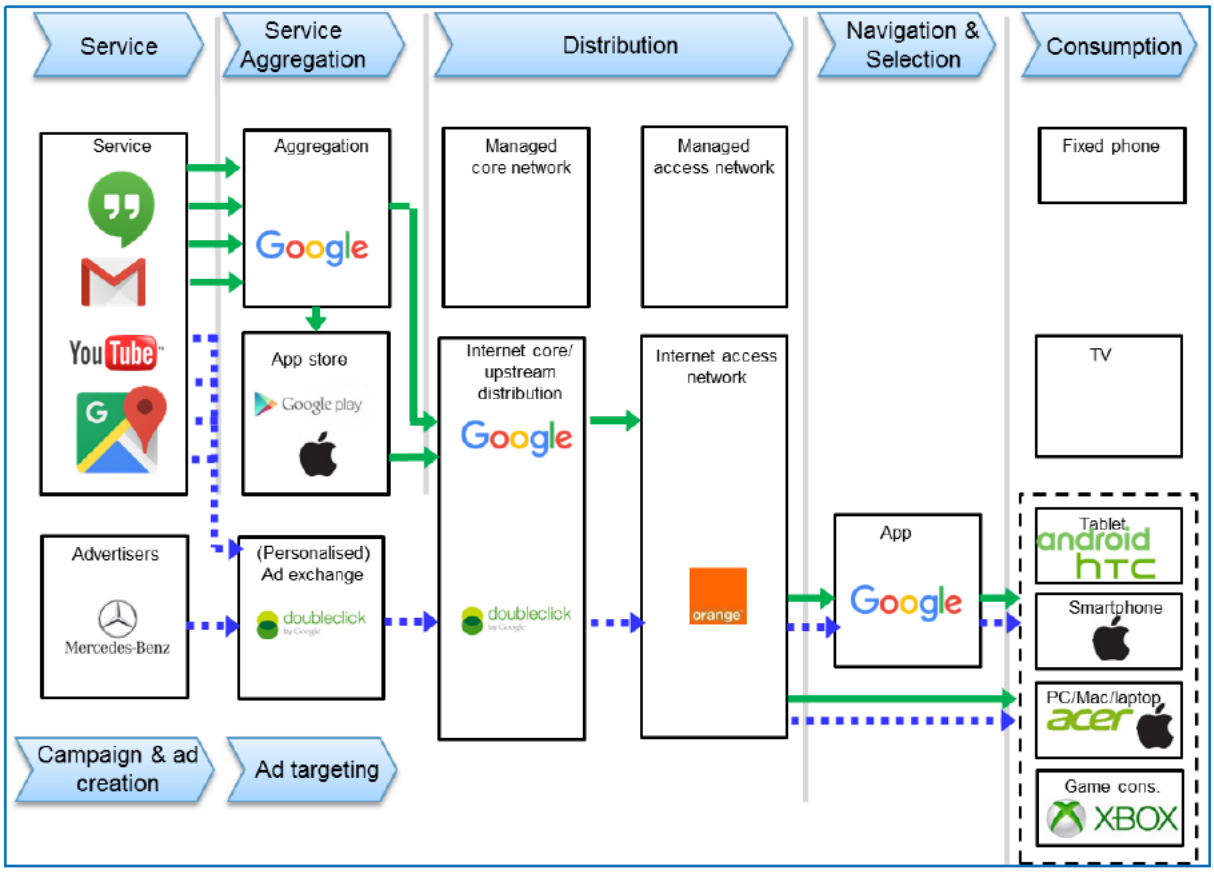

Image 2.4. Google's advertisement model. [3]

In Table 2.2 it is shown how Google get revenues with this model.

Table 2.2 Google's assets within its advertisement model. [3]

Google Asset	Description	Evaluation
User Data	Obtained through a range of applications.	Key asset: Google's data set is large and hard to replicate.
Data analytics/algorithms	The analytics are crucial to extract value from the user data.	Relevant asset but not key as other companies have it as well.

Highly skilled technical personnel	Engineers and data scientists to develop Google's global IT/cloud infrastructure and algorithms.	Relevant asset but not key because it is not unique to Google (e.g. Apple and Facebook also own this asset).
Global IT/cloud infrastructure	This infrastructure is important in the delivery of high-quality and responsive applications.	Relevant asset but not key as there are multiple companies that have and even offer large IT/cloud infrastructures (e.g., Amazon).
Service diversity with the bundle	The diversity of the applications increases the stickiness of the Google ecosystem.	Relevant asset but not key as it is not unique to Google. Google arguably has the most diverse and extended set of applications.
Global user base		Key asset although not unique to Google. Google has one of the largest user bases.
Strong global brand	Google is a well-known global brand.	Relevant asset but Not a key asset as people may choose other brands that offer services that work well.
OS platform	The Android OS that Google offers for tablets and smartphones. Used by many popular handset brands, such as Samsung and Sony.	Key asset: Android is used on the majority of mobile handsets and provides the scale for wide distribution of applications through pre-instalment.
Advertising platform	The platform offered to advertisers to manage their (personalized) market/ads campaigns.	Relevant asset but not unique to Google: there are many other advertising platforms available.
Contracts with advertisers using the advertising platform	The relationship with advertisers (directly or indirectly) is crucial to obtain advertising revenues.	Key asset: the existing contracts/relations with advertisers are unique to Google and not easily reproduced by others.
Website and apps	The ads are placed on the Google search engine, on Gmail, on YouTube, etc.	Key asset: the large user base reached by the Google applications, including its very popular search engine is difficult to match by other

companies.

The same happens with Facebook: it offers to his users a free exchange platform and gains from advertising. Facebook provides social communication services through its social network platform, where it is possible to post/comment/like content, and an instant messaging service via Facebook Messenger. Advertisement is integrated in the researches in the case of Google, as the first results are the sponsored ones, but at the same time they are related with the research. In Facebook advertisers can create a page for the brand or purchase advertising space on the website: they can choose their targets thanks to data stored by Facebook (age, location ,...). In Image 2.4 Facebook's advertisement model is represented: the path of the value offered to the consumer is similar to the Google's one, but Facebook use different advertising platforms (LiveRail for video ads, Atlas for cross-device advertising, Audience Networks to deliver ads on mobile apps).

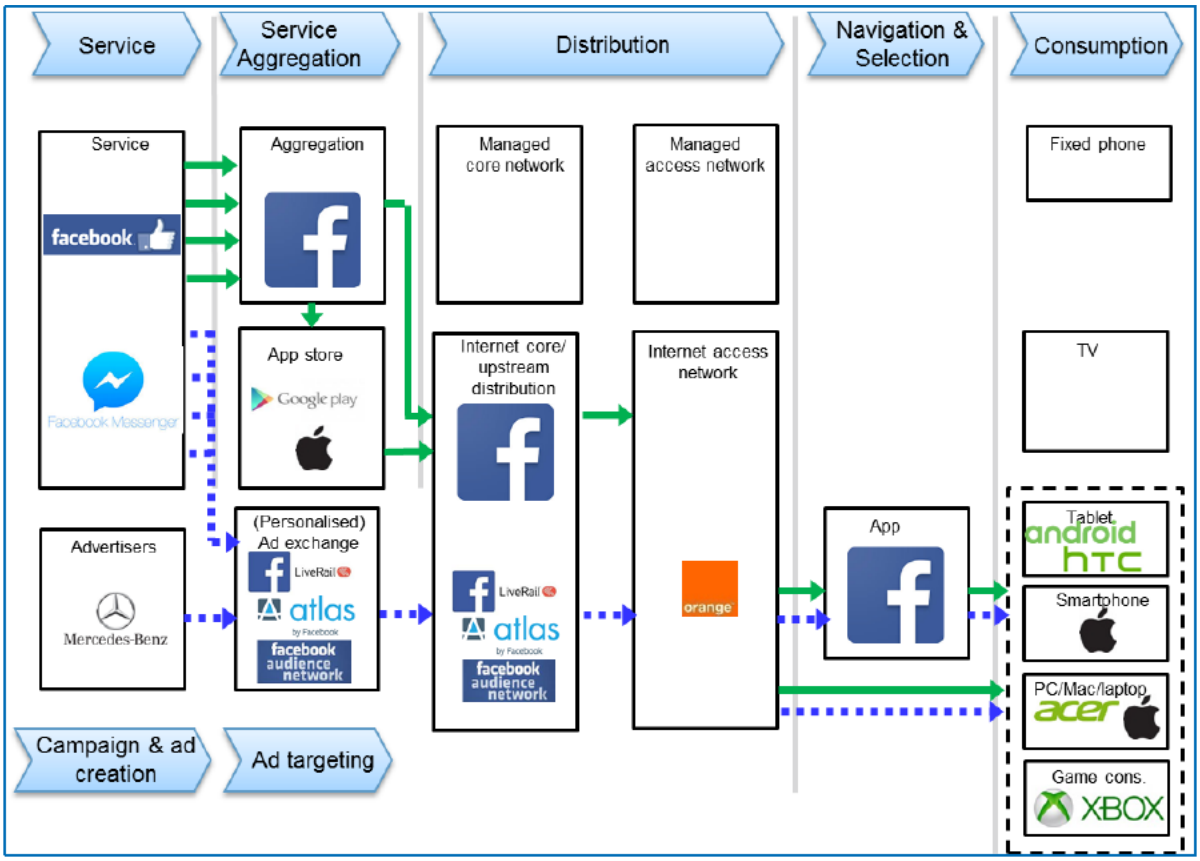

Image 2.5. Facebook's advertisement model. [3]

In Table 2.3 we represent also Facebook's assets with this model, very similar to Google's ones.

Table 2.3. Facebook's assets within its advertisement model. [3]

Facebook Asset	Description	Evaluation
User Data	Obtained through Facebook's social network.	Key asset: it represents an unique angle; the social aspect.
Data analytics/algorithms	The analytics are crucial to extract value from the user data.	Relevant asset but not key as other companies have it as well.
Highly skilled technical personnel	Engineers to maintain/develop Facebook's global IT/cloud infrastructure and top data scientist that can analyze data and improve Facebook's algorithms.	Relevant asset but not key because it is not unique to Facebook (e.g. Apple and Google also own this asset).
Global IT/cloud infrastructure	This infrastructure is important in the delivery of high-quality and responsive applications.	Relevant asset but not key as there are multiple companies that have and even offer large IT/cloud infrastructures (e.g., Amazon).
Global user base		Key asset although not unique to Facebook. Facebook has one of the largest user bases.
Strong global brand	Facebook is a well-known global brand.	Relevant asset but not a key asset as people may choose other brands that offer services with similar "social" aspects (friends, profile, social history).
Social graph/history	The social graph contains the activities and relations between Facebook's users and underpins the user data.	Key asset: it is difficult to reproduce, as it would require a significant effort from the consumers (rebuild its social graph, share photos and updates) and would imply the loss of the history accumulated so far (previous photos and interactions).
Advertising platform	The platform offered to advertisers to manage their (personalized) market/ads campaigns.	Relevant asset but not unique to Facebook: there are many other advertising platforms available.
Contracts with advertisers	The relationship with	Key asset: the existing

using the advertising platform	advertisers (directly or indirectly) is crucial to obtain advertising revenues.	contracts/relations with advertisers are unique to Facebook and not easily reproduced by others.
Website and apps	The ads are showed in Facebook's social network apps and web pages.	Key asset: the large user base reached by Facebook and the amount of time spent makes this asset both valuable and hard to reproduce.

As example of an access model, we can analyze Apple's access model. Apple manufacture devices and bundle content with them, including communication apps services like iMessage and FaceTime. Other applications are available through Apple Store platform, where users can buy apps offered by developers that pay a fee to Apple to offer their apps on the company's platform. Consumers pay for Apple devices (such as iPhone, iPad and Mac) for having Apple's services in return, and the devices' sales is the main source of revenue for the company. In Image 2.5 Apple's access model is represented.

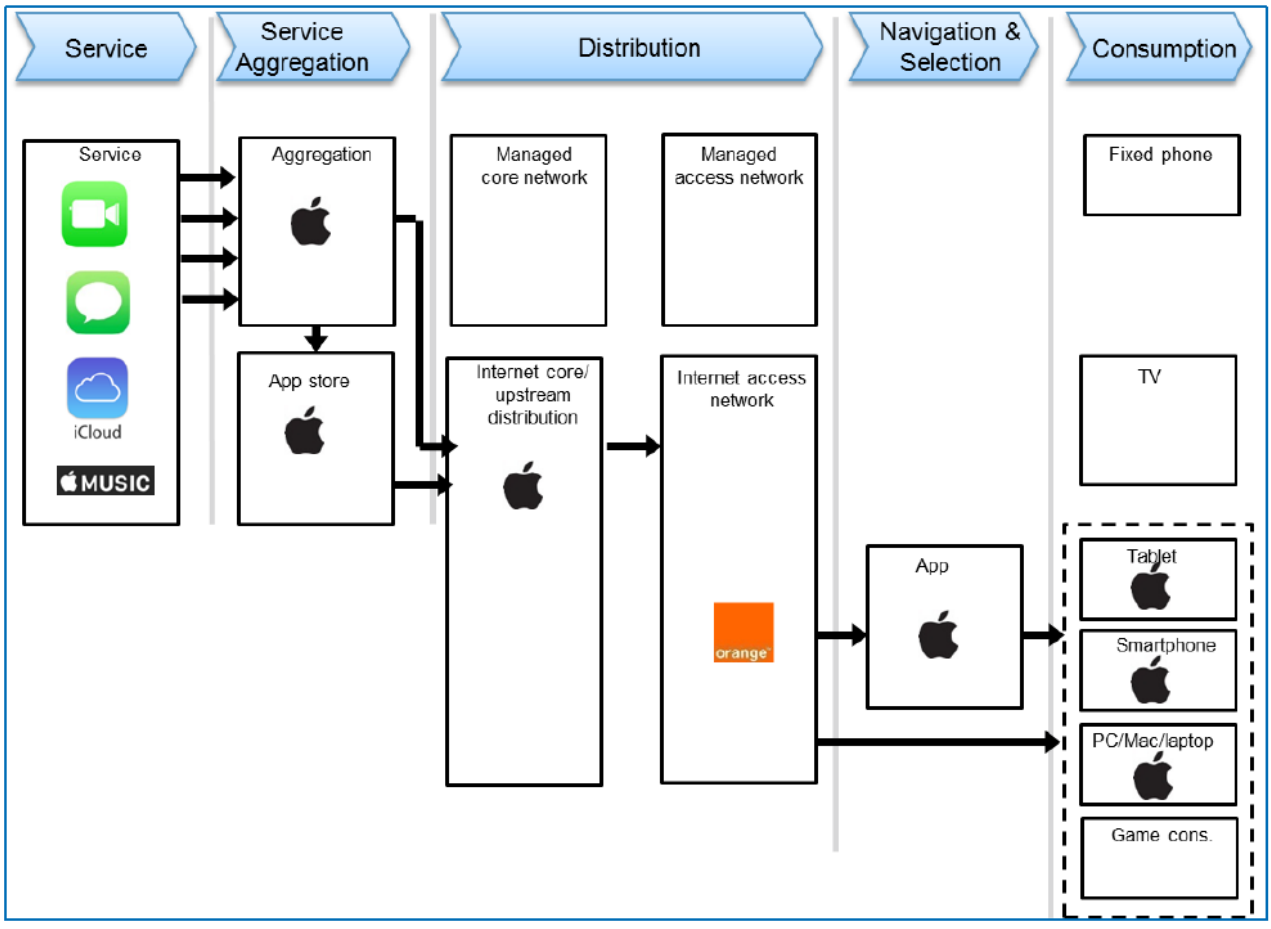

Image 2.6 Apple's access model. [3]

Apple's assets within this model are shown in Table 2.4.

Table 2.4. Apple's assets within its access model. [3]

Apple Asset	Description	Evaluation
Global user base		Relevant asset, not unique to Apple.
Strong global brand	Apple is the best established premium brand for smartphones with the most loyal customer group.	Key asset: large group of customers are willing to pay a premium price for Apple devices.
User experience expertise	Design of devices and user interfaces.	Relevant asset: user experience is the main factor behind the attraction of the devices and the Apple brand.
Strong device ecosystem	Combination of devices, cloud infrastructure and apps provides complete portfolio.	Key asset: attracts app developers and customers, also important to retain customers as ecosystem works exclusively with Apple devices.
Mobile OS	Apple's iOS mobile operating system.	Key asset that underpins the device ecosystem.
Local presence	Apple operates a number of flagship stores in larger cities, complemented with a number of certified Apple-only retail chains.	Key asset: the large user base reached by Facebook and the amount of time spent makes this asset both valuable and hard to reproduce.
Global IT/cloud infrastructure	This infrastructure is important in the delivery of high-quality and responsive applications.	Relevant asset, but not unique to Apple as there exist multiple large cloud infrastructures
Access to large scale production facilities	Factories for smartphones and tablets.	Relevant asset, but not unique.

2.2.2 Characteristics of digital economy

Sokol [5] outlines several factors that we must consider in the landscape of digital economy. The most relevant are: **network effects** (discussed in 2.1), economies of scale, multi-homing

possibilities, capacity constraints and collection of data. **Economies of scale** are typical of online platforms since the cost of collecting, developing and maintaining algorithms and databases are independent from the volume of transactions; they imply that the average cost decline as the number of users increase. Thanks to economies of scale, major digital platforms can leverage their power to obtain lower fees or input costs from suppliers. The same happens also to non-digital firms, but with digital platforms the effect is stronger since the marginal costs are near zero. **Economies of scope** make the average cost decrease as the firm grows. Digital economy is characterized by high startup costs and low incremental costs: this favors market concentration. The incumbent company that already sustained these costs is able to exploit economies of scale to maintain low variable costs. Both network effects and economies of scale lead to market concentration, while **capacity constraints** do the opposite. In fact, even if, being digital, they don't have physical constraints, there are limits of capacity even for online platforms. Advertising space is often restricted because it can't hide information for the consumers, and screen size, especially in mobile devices, can be a constraint for advertising space and the number of products to be displayed. **Multi-homing** is another feature of digital platform; it is the possibility for users to choose and join different platforms and how easily users can multi-home depends from the pricing policy of the platform and the switching costs between platforms. In a social network platform like Facebook it is easy to multi-home, having another account in another social network. But, for example, switching costs for an Amazon Prime user are higher since he made a specific investment and it is more likely that he will use Amazon Marketplace to buy a product than another competitive platform. In general, multi-home partly neutralize the role of network effects, but platforms found ways to avoid users' multi-homing: a way to do so is creating membership programs like Amazon did with Prime; another one is to operate multiple platforms, like Facebook is doing (he bought Instagram and WhatsApp), finally platforms can bundle its services together offering multiple services in the same platform, as Google does.
Finally, online platforms are characterized by the **collection of users' data.** They use this data in order to improve their services and provide additional value to users: for example, Amazon can collect data about a user's past purchases and give him shopping recommendations, Google can identify most relevant results for a query.. Data is inexpensive and easy to collect, has almost zero marginal costs of production and distribution. Data-driven markets have low entry barriers and a new and innovative business model can always be a threat. In fact, a digital company doesn't have to sink capital into physical facilities so that it is easier to enter in the market; and adding new features doesn't imply modifying assembly lines since online platforms are built from software code that can be changed continuously. GAFA companies are facing the threat of new entrants by continuously innovating themselves, integrating innovation in their business – thanks to the enormous quantity of user data they own, they can capture feedbacks or information to improve performance in almost real time - or acquiring companies with a new potentially successful technology or business. "For example, consider the manufacturer of a device (e.g. a smartphone) and an operating system (OS). After strengthening its position in the device/OS market through innovation, the manufacturer can leverage its financial resources into adjacent markets (like a music streaming platform). For the same reason and at the same time the innovations serve to defend the market position for in case dominant players from adjacent markets intend to leverage their financial resources into the OS/device market" [4]

Table 2.5. Characteristics of digital economy for every type of online platform. [5]

	Marketplaces	App Stores	Social Networks	Online Advertisement
Network effects	Direct: low for sellers and buyers Indirect: high for sellers and buyers	Direct: high for users, low for developers Indirect: high for users and developers	Direct: high for users; low for advertisers Indirect: low for users, high for advertisers	Direct: low for users, publishers and advertisers Indirect: low for users, high for publishers and advertisers
Economies of scale	High	High	Medium	High
Capacity constraints	Medium	Medium	High	High
Multi-homing	Medium for buyers; low/medium for sellers	Low for users; medium for developers	High for users and advertisers	High for users and advertisers, medium for publishers
Main companies	Amazon, eBay, booking.com	Google Play, Apple App Store	Facebook, LinkedIn	Google Search, Facebook Ads, AppNexus

2.2.3 E-commerce marketplace

An electronic commerce marketplace provides a place for conducting activities in the same way as a traditional business, with the peculiarity that transactions are executed through an online platform. This allows multiple users and sellers to interact, getting over the physical boundaries since Internet is easy to access in no time from different locations. There are pure e-commerce marketplace like booking.com, and others that also operates in the more traditional online retail business, like Amazon. This type of online platform is characterized by high indirect network effects, since if the number of buyers that access the platform increases, so does the number of sellers, and vice versa; high economies of scale since there are high fixed costs while variable costs triggered by additional transactions are low. For many sellers it is not attractive to multi-home since it is difficult to build reputation in different platforms as it depends from the number of successfully completed transactions, and many platforms use to lock-in sellers, for example by imposing the use of a proprietary booking tool. This implies low bargaining power for sellers. For buyers it is more easy to multi-home since they can choose to buy the same product from different platforms, although there are some lock-in effects implemented by platforms to bind users, like the Amazon Prime subscription or the collection of users' data that allows the possibility of one-click shopping and shopping recommendations. However, the fact that sellers are not likely to multi-home influence also the willingness of buyers to do so, because of the strong indirect network effects. All these characteristics implicates that it is unlikely that existing large e-commerce marketplace will lose their strong position in the foreseeable future.

2.2.4 App Stores

The mobile app industry began in 2007 with Apple's introduction of iPhone and it grew with the entry of several competitors. The core software of smartphones is the operating system, and it contains some core applications installed by default, among which we can find app stores. App Stores distributes mobile apps and the most relevant are Apple App Store and Google Play Store, that can exploit high economies of scale and it is extremely difficult for smaller app stores to compete. To distribute their apps, developers must pay a one-time registration fee of 25 dollars in Google Play and an yearly payment of 99 dollars in Apple app Store. They receive the 70% of revenues from their apps in both stores, while the remaining 30% goes to the platforms. Users' multi-homing is really low since they are bounded to use the pre-installed app store in the operating system of their smartphone. Developers, on the other side, can multi-home, even if there are some apps that can be installed only in some operating systems or exclusive apps. The indirect network effects are strong, while the direct are high only in the users' side: the more users install and use an app, more likely it is that other users will join.

2.2.5 Social Media

In social media industry multiple sites compete in a specific category (like social networks, video-sharing, online dating, ...). It is really easy for users to multi-home between different social media platforms since in general, there are low switching costs.
The most popular category is the one of social networks: it is characterized by user generated content and they usually offer some basic function like a profile, a list of contact and a messaging channel. The fact that it is easy to multi-home has the consequence that a social network can lose users easily to other platforms. There are high investments costs, for example to establish a strong server system, but this doesn't lead to high economies of scale since computer capacities can be rented also with short notice and smaller social networks doesn't have to sustain necessarily high fixed costs. There are strong direct network effects since the amount of users of a social network is the main attraction for other users to join. In fact, it is not difficult for users to have an account on different social networks and the presence of strong direct network effects implies that if many users switch their habitual social network, the others will follow. Facebook is the leading social network platform, even if there are lots of similar providers respect the ones of other online platforms. This is due to the fact that social network expansion is still at the early stage of its expansion curve compared to other online platforms.

2.2.6 Online Advertising

The model of online advertising is based on generating traffic by giving away content and selling the traffic to advertisers: the industry is about selling and buying advertising space that can be reached by users through Internet. There are four types of industries: search advertising that appears on search results pages, display advertising on non-search web pages, listing on websites and e-mail based advertising. Search-based advertising is the most relevant type, followed by display

advertising. Online advertising differs from the offline one since it can exploit user data to target individuals and personalize ads. The indirect network effects are high for advertisers, that are more likely to join the platform if they can count on a large amount of users' data. Google and Facebook are the platforms that attract most of internet traffic and users' data and the largest operators in the online advertising industry.

2.2.7 Competitive landscape

The competition between digital platforms has little to do with the price: they **compete to get audience** through the services they offer to the users. In particular, as a study brought on by the Policy Department of the European Commission outlines [4], online platforms compete mainly in four dimensions: **connection**, **content**, **utilization** and **consumer experience**. Connection has to do with distribution networks, mobile operating system and devices, while utilization measure the difficulty in finding and using the platform. The content offered is very important since platforms always try to differentiate and create unique content and features. Finally, competition on the experience area is brought on optimizing and improving the services offered to the consumers. Price is a smaller fifth dimension, since as we said most of online platforms don't charge a direct price to users: price enters in the mix when there is no alternative or they are less likely to look for one, for example with Netflix. The key to success and differentiation from competitors in the digital arena is to offer a better content to the costumer, in order to conquer his trust and drive more consumers to join the platform and their engagement. The ability to compete for audience increases when a company has more platforms in different areas (for example Google is a platform as a search engine, a mail service, an app store, ...). In fact, combining users' data from different platforms the company can largely improve its services and at the same time provide a better offer to the other side of the market (the developer market). Users using different services from the same company give the company detailed data about themselves. When you search on Google you are offering the company your interests and the information about the website you are visiting; with Gmail you are sharing your personal life through your private e-mails; with Gmaps you are telling where you are, and so on. At the same time, advertisers are offered a one-stop-shop where they can exploit detailed user data with a combination of different sources. For this reason, online platforms tend to extend its market and as they get bigger inevitably get to compete with each other. In fact, *"online business models continuously develop new products and services as well as improve existing ones. By doing so, online firms constantly redefine the boundaries of digital markets and tend to compete for markets — or aim at creating new markets — rather than compete which each other in existing markets."* [4]

All four GAFA companies started in a different business but as they conquered the market after market, they started competing with each other in many areas: Google, for example, competes with Facebook in the advertisement market, with Apple in the operating system and smartphone market, with Amazon in the online search market. This means that in some areas there is a digital oligopoly rather than a monopoly, and the war for markets between GAFA companies is getting more and more hard. Lately, they are competing in the digital assistant market, since getting consumers in this

market could give them opportunity to favor their services through the utilization of the voice assistant. The Table 2.2 shows how GAFA compete with each other in different areas.

Table 2.6. Competition between GAFA companies in different categories of market. [6]

Category	**Apple**	**Amazon**	**Facebook**	**Google**
Search	-	Product search	-	Google
Browser	Safari	-	-	Chrome
Mail	iCloud mail	-	-	Gmail
Messaging	iMessage	-	Messenger, WhatsApp	Hangouts
Operating System	iOS, macOS	Amazon Fire OS	-	Android, ChromeOS
Maps	Apple Maps	-	-	Google Maps, Google Earth
Social Networking	-	Twitch, Goodreads	Facebook, Instagram	Google+
Cloud	iCloud	AWS, Amazon Drive	-	Google Drive, Google Cloud
Streaming device	Apple TV	Amazon Fire Stick, Amazon Fire TV	-	Chromecast
Voice assistants	Siri	Echo/Alexa	Messenger Bots	Google Home
Entertainment	iTunes, App Store, iBooks	Amazon music, Video, Game Studio, Kindle eBooks	Games	Google Play, Google Books
Advertising	-	Amazon advertising	In news feed, Audience network	AdWords, AdSense, DoubleClick

2.3 Market dominance of digital platforms

Some platforms exploited the power of their business model and became “unicorns”, acquiring market share and very high valuations in record time. Moreover, the combination of high initial costs and near zero incremental costs for every new user favors increasing levels of market concentration, since a new entrant should invest a lot of money in a market where network effects already determined a dominant platform with a great audience and reputation. [7]

2.3.1 Growth analysis

In the last years these companies grew so quickly that they climbed to the first rankings in their markets. The rankings in Table 2.3 and Table 2.4 show how the marked changed in the last ten years: in 2018 the first most valuable companies are GAFA and Microsoft – all tech companies – while in 2008 the only tech company in the ranking was Microsoft.

Table 2.7. First six companies by market capitalization, 2008. [8]

2008	RANK	COMPANY	MARKET CAPITALIZATION
	1	Exxon Mobil	403,366
	2	PetroChina	325,320
	3	General Electric	253,674
	4	Microsoft	243,687
	5	Wal-Mart Stores	235,605
	6	Procter&Gamble	211,460

Table 2.8. First six companies by market capitalization, 2018. [9]

2018	RANK	COMPANY	MARKET CAPITALIZATION[1]
	1	**Apple**	1,073,000
	2	**Amazon**	964,190
	3	**Alphabet**	896,910
	4	Microsoft	859,840
	5	**Facebook**	475,900

To have a closer look to how quickly GAFA companies grew in these years, the following images (Image 2.3, Image 2.4, Image 2.5, Image 2.6) show the evolution of the market capitalization of the four platforms.

[1] Market Cap retrieved 02-10-2018

Image 2.7 Apple Market Cap evolution in the last 10 years. [9]

Image 2.8 Amazon Market Cap evolution in the last 10 years. [9]

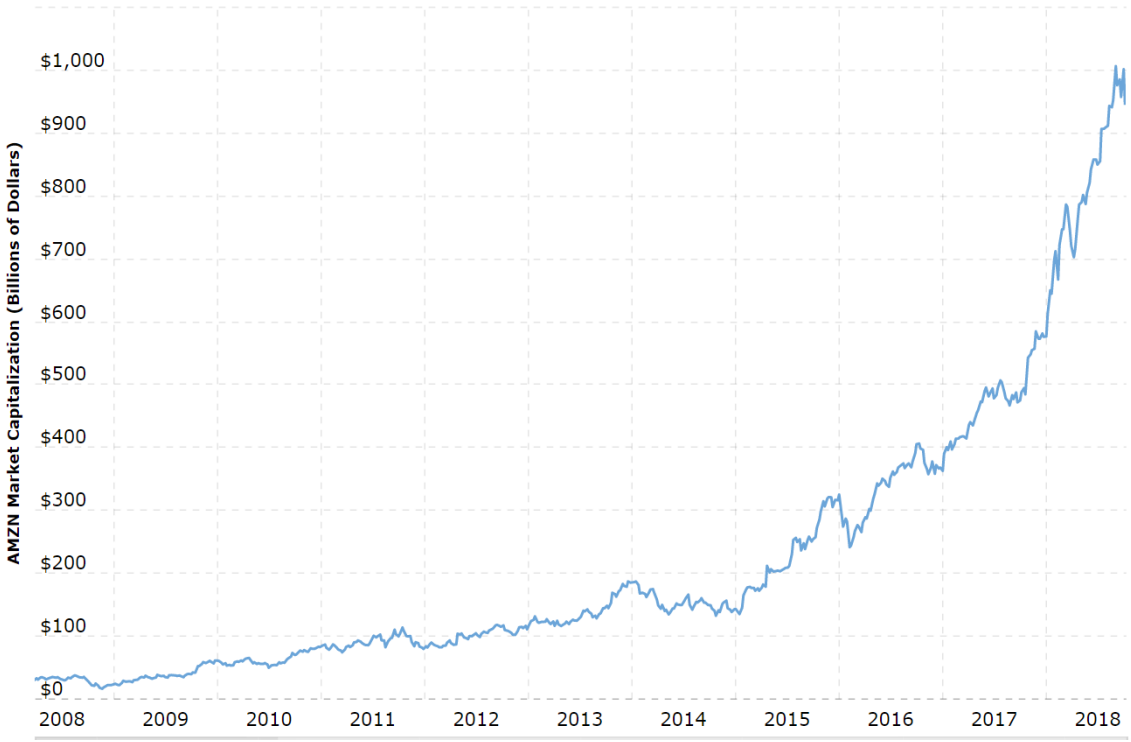

Image 2.9 Alphabet (Google) Market Cap evolution in the last 10 years. [9]

Image 2.10 Facebook Market Cap evolution from 2012[2]. [9]

2.3.2 Market power calculation

In traditional markets, a way to measure market power is by calculating **Lerner Index**: it is defined as it follows, where P is the market price of the company's product and MC is the marginal cost:

$$L = \frac{P - MC}{P} \qquad (2.4)$$

The 2.4 is the general equation for the calculation of the Lerner Index in traditional one-sided markets. The Lerner Index returns a value between 0 and 1, where 0 means perfect market competition and 1 means monopoly. The index measures the ability of a company to price above the marginal costs.

It is usually difficult to calculate the Lerner Index with 2.4 since a firm's cost structure is often unobserved and it is hard to determinate marginal costs. Considering the first order condition (FOC) of profit maximization, that is the point where marginal costs equals marginal revenues, the Lerner

[2] Data available only from 2012 since Facebook Inc. went public in 2012.

Index can be calculated also with demand elasticity. In this way, we can calculate the Lerner Index also as:

$$L = -\frac{1}{\varepsilon_D} \qquad (2.5)$$

The previous analysis can't be applied with online platforms. In fact, in the case of a multi-sided market platform, we have to consider that there are different markets that interact with each other through the platform and these interactions are charged with different prices.

Suppose we have i types of interactions I for the platform, that charges a different price p_i for each interaction. Each type of interaction has a demand that depends on the amount of total interactions and on the competing platform's prices. Analyzing the case of a two-sided platform, we have two kind of interactions, the one of the developers market and the one of the consumers market. For example, in a platform like an App Store developers interact with the platform providing the apps they develop and are charged for using the platform for it (I_1), while consumers interact with the platform when they purchase developers' apps from the store (I_2). In addition, as we discussed, in digital platform there are network effects, so that the increase of interaction of one side determinates the increase of interaction of the other side ($dI_1/dI_2 > 0$) and the platform is able to subsidize one side by charging the other one.

These interactions should be considered for evaluating market power in multi-sided markets, so that the Lerner Index becomes:

$$L = \frac{\sum i[(p_i - MC_i)I_i]}{\sum i(p_i * I_i)} \qquad (2.6)$$

In the one-sided market case, we have only a type of interaction, so that the term I can be simplified and we return to the original equation (2.4). With equation 2.6 we calculate a Lerner Index that in the numerator weights each price-cost margin and in the denominator each price for the corresponding interaction. We can rewrite the equation also using administrative data, as the ratio between variable profits and total revenues:

$$L = \frac{\pi + FC}{TR} \qquad (2.7)$$

Where π indicates the firm's profits, FC the fixed costs and TR the total revenues. We can calculate GAFA's Lerner Index using their financial data: [10]

Table 2.9. Income statement information of GAFA companies at 31/12/2017. [11]

31/12/2017	Revenues	Fixed costs	Net income	Lerner Index[3]
Alphabet	110,855	84,709	12,662	0,878
Amazon	177,866	173,760	3,033	0,994
Apple	229,234	167,890	48,351	0,943
Facebook	40,653	20,450	18,193	0,951

We can observe how the Lerner Index is very close to 1 for all GAFA companies. The analysis doesn't have to be taken as perfect since we are not considering other components like the very low taxation of online platforms and their business model, that often don't prioritize maximization of profits. In fact, we can see how Amazon's net income, in particular, is very low, because of its business strategy (see chapter 3).

2.3.3 Consequences on consumers' welfare

The digital platform's dominance of the market has controversial effects on consumers' welfare. On one side, they have a positive effect because they can promote efficiency, economy of scale and positive network effects. Since the platform can calibrate how much they charge every side, the effect for the consumer – the subsidized side – is that he pays a smaller price (or no price at all) for most or all the platform's services. Moreover, as the audience grows, consumers are more willing to join it because of the network positive effects: the value of the platform grows with the number of users.

Moreover, platforms can customize an offer that best suits the consumers' need: for example, when Apple developed the strategy to sell a single song at a fraction of the album's costs, consumers responded positively: they could mix music tracks without having to pay for entire albums. Online platforms can offer "*new and cheaper alternatives, such as Uber divers' private transport instead of tariffed, taxi service. Private operators typically have less overhead in commercializing their private automobiles, and incur far less market entry costs than what taxi operators bear e.g., rationed and high cost licensing and regulatory burdens such as compulsory pricing of service."* [7] All these facts picture a "win-win" situation for platforms and consumers.

On the other side, in the long-term consumers can suffer from the lack of competition, since the brick and mortar competitors of online platforms could shut down or fail because they can't compete with their prices. It is possible that "*at some point, online platform operators may consider their market position sufficiently impenetrable so that they can refrain from aggressive price cutting and forgoing near term profitability".* [7] Network effects, even if they are positive for consumers because allow them to communicate with more peers, at the same time favor this outcome, since they raise switching costs, making consumers less incline to multi-home and locking them in while raising entry barriers. Consumers also often don't know how much value they are offering platforms when they share their personal data, agreeing on privacy issues like giving access to their

[3] Calculated with equation 2.5

location, website visits and researches, email's and post's topics. Frieden underline how "*platform operators emphasize how much value they confer to subscribers who do not have to make a direct payment. They conveniently ignore substantial financial compensation that flows from indirect sources, such as advertisers, and frame their role as creating a mutually beneficial arrangement".* [7] Platforms use this data to maximize profits, changing prices according to the demand and the interests of the costumers and selling users' data to third parties, after collecting and analyzing it. Free access given to consumers implicates higher charges on the other side of the two-sided market (developer market) and in order to recuperate the loss they'll raise prices of their goods/services: this will at the end be taken on the consumer. Obviously data is utilized by online platforms also to improve the service it offers to consumers and developers, but the risk can be "*that users become locked-in to services of a single provider because that provider is able to provide a much better user-experience for all of its services as it can re-use personal information across service platforms for this purpose."*

In conclusion, the "free access" that many consumers assume they have, is not so free, because it fails to consider two costs:

1. The increased price in advertised goods or services
2. The monetary value of the data that consumers provide every day, their needs, desires, web site visits, purchases, location, communications and so on. This personal data is collected, stored, analyzed and sold.

For the second point, it has been recently introduced a new regulation about data privacy and protection, GDPR, that demonstrate how the authorities are starting to worry about the importance of users' data. (see section 4.2.4).

3. GAFA Companies

3.1 Amazon

3.1.1 History

Amazon is an American electronic commerce and cloud computing company founded by Jeff Bezos on July 5 1994, in Seattle, Washington. He initially incorporated the company with the name Cadabra Inc, and the name survived until some months later. He found the word "Amazon" in the dictionary, as the world's biggest river. "This is not only the largest river in the world, it's many times larger than the next biggest river. It blows all other rivers away," [12] Bezos said, and on November 1, 1994, he registered the new name. At the beginning, Bezos started the company with the purpose of exploiting the use of Internet, that was spreading more and more in society: he saw the opportunity of e-commerce, selling products via web, and he decided that his company was going to sell books. In the first months Amazon.com had great success in the web, offering to the costumers the possibility to order and pay a book online and have it delivered at home. In the first thirty days Amazon received orders from 45 different countries. [13] Thanks to Internet, the company was able to spread all over the USA quickly and with a small amount of capital. The prices were really affordable because as Bezos stated "*We don't make money when we sell things. We make money when we help customers make purchase decisions*." [12] With these premises, at the time, Amazon's future seemed a little ambiguous: it had about $139,000 in assets, $69,000 of which was in cash. In his first year the company had a loss of $52,000 and it was about to lose another $300,000 in the second one. Anyway, Bezos would confidently tell investors he projected $74 million sales by 2000 if things went moderately well, and $114 million in sales if they went much better than expected. (Actual net sales in 2000: $1.64 billion.) Moreover, he told investors the same thing he told his parents: the company had a 70 percent chance of failing. Bezos and his company appeared on the Wall Street Journal in the spring of 1996: from that moment the orders doubled and so did the investors willing to collaborate with their capital in the company. [12] Bezos put effort in making the site as customer-friendly as possible, offering topic areas to browse, lists of best-sellers, and a recommendation center for the ones who couldn't decide. Amazon also added a review feature, in which the costumers could give an opinion about a book and read other one's opinions about it. The "Associate" program had a great success: costumers could place ads on their own website to allow visitors to buy the chosen book directly from Amazon. In the summer, the Associate program went on and Amazon offered from a 3 to an 8 per cent commissions to the websites that agreed to send their customers directly to Amazon website when they wanted to buy a book. The program really started to give results in 1997 when a partnership was established with really relevant websites like Yahoo Inc. [14] Bezos also pushed for the implementation of a tool that made purchase suggestion to the costumer basing on the previous books that he had bought: this feature was called "Similarities" and allowed costumers to buy books they couldn't have found otherwise, and by 1997 he implemented a "one-click" ordering process.

In 1997, after less than two years of operation, Amazon.com became a public company in May 1997 with an initial public offering (IPO) of $18/share, raising $54 million. [12]

By 1998 the Associate program counted 60,000 members and 2,26 million of costumers accounts (564 percent more than the previous year), and Amazon was already the third largest bookseller in the United States. [14] In 1998, after acquiring the start-up Junglee (first comparison shopping company) the company also announced that it was going to go beyond books. [12,15] The first choice of expansion was music, and in 1999 Amazon went on with toy and electronics. Bezos continued focusing on market share over profit, and although the sales were always growing, the company continued to register deep losses. The more the sales grew, the more Bezos was investing money; this put the company in risk many times and investors, public and Amazon employees began to lose confidence in the CEO: by the start of 2000, with the addiction of the dot-com crisis, Amazon was standing on the precipice. Until that moment, the employees' condition were really stressful, they worked tirelessly, sacrificed holidays in in exchange for high compensations but in those years the disillusionment started to spread; they claimed Bezos was so focused in the costumers' satisfaction and the company's growth that he lacked of empathy for his employees and their contribution to the company. Bezos never lose his optimism and went on with his convictions and his strategy. Amazon focused on price cutting, got over the crisis and in 2002 launched its apparel stores, reporting a net loss of $149 million against the $567 loss of 2001 and registering a profit of $3 million in the fourth quarter of the year.

In 2005 the company launched Amazon Prime, a membership for a price of $79 par year and a free two-days shipping. The membership turns costumers into Amazon addicts and this caused losses for the company but fulfilled Bezos's everlasting purpose of satisfying costumers and retaining them to Amazon. The effect was that customers moved from comparing different websites for their purchases to using only Amazon, and competitors like eBay started to decline. In 2007 Amazon introduced the first Kindle, a device able to two hundred title, sold at a price of $399. With Kindle you could buy bestseller and new releases at $9,99 and this started the nightmare for bookseller companies. During the next years Kindle became available for many devices as an iOS application, iPad, Blackberry, and by 2011 Amazon was selling more Kindle books than the printed ones. From 2007 a group operating inside Amazon was in charge of studying the competition and notify a committee – that included Bezos – in order to turn off the emerging threat. In this way Amazon, during the years, invested money buying possible competitors. In this way the company neutralized every threat and added to his pocket always something more to exploit. [12,14]

Amazon made lots of acquisition during 2010-2012 years. In 2011 Amazon bought Lovefilm and some months later announced the introduction of Prime Video: this choice came mostly in order to take costumers from Netflix. In the same year add an application for smartphones that allowed to compare prices in the store with Amazon's one by scanning the bar code of the product; moreover, the company offered a 5 percent discount to the costumers that used the app. The decision caused lots of critics, as the application was pointed as a way to destroy competition. [16] Between 2012 and 2013 Amazon kept on adding new categories to his store, continually expanding his offer until the costumers were able to find really everything in there, and since now the company was collecting sales taxes and didn't have to worry about avoiding it, it started expanding with more and more fulfillment centers around the world. [12]

In 2016, Amazon made his first delivery with a drone, in England, just 13 minutes after the order was made: this opens new possibilities for the company, whose purpose in the last years seems to be independent from third-companies – like UPS and FedEx for the shipping procedures – developing autonomous ways to reach the same goal. [17]

In the winter season of 2016 Amazon alone captured 38 percent of online sales, while the next nine largest competitors – all together – reached the 20 per cent. A research conducted in 2016 also shows that 52% of americans is a Prime member. [18]

Image 3.1 In 2016, 52 per cent of american householders has a Prime subscription [18]

In 2017 Amazon bought Whole Food, a big supermarket chain, demonstrating its interest in moving on grocery business: in the beginning of 2018 the company opened in Seattle the first Amazon Go, a store filled with cameras and sensors in which customers can enter scanning their smartphone and going out with groceries without making lines to pay, since the amount is charged directly to their credit card connected with the app on their smartphone. [19,20] Acquiring Whole Food will also allow Amazon to reduce its shipping costs – the highest ones – since it gives the company a physical presence in urban centers. [18]

3.1.2 Business strategy

Amazon has achieved the dominance of e-commerce market pursuing two strategies: **aggressive investments that implicates losses at the expense of profit**, **and integration in different business areas**. Talking about the first strategy, we can observe the general trend of Amazon's profits and revenues in Image 3.2: Amazon reported losses for great part of its history, only lately it is starting to make profits – thanks to Amazon Web Services. The strategy prioritize growth in order to achieve scale: Amazon did this by investing continuously in new businesses, with the purpose of becoming a shop where you can find everything with no need to search somewhere else.

Image 3.2 Amazon's profit and revenues from 1997. [22]

The thing that consolidated the most Amazon's market power was **Amazon Prime**: even if the company was having huge losses because of it, it made customers Amazon-dependent. In fact, according to analysts, Prime subscribers increase their purchases on Amazon by 150% and spend more on the website in order to obtain a bigger return on their investment. As a result, they are not inclining to compare prices or searching products in a competitor's website: Prime changed people's mentality as that they wouldn't shop anywhere else, and that was exactly what Bezos' strategy meant to achieve.

With the introduction of **Kindle**, Amazon started selling e-books setting best-sellers' price at $9,99. The price was below cost, and it was impossible for publishers to keep up; but it wasn't classifiable as predatory pricing – the anticompetitive act of setting prices low to eliminate competition – since, best-sellers a part, the whole business of e-book was profitable. Amazon only had to raise prices on other e-books. Moreover, the advantage of digital books was that once bought a Kindle, lock-in effect took place: the device could read only certain e-book types, so it was unlikely that who had a Kindle didn't buy e-books on Amazon, even if the price of a particular book was a little higher than somewhere else. This choice had the same purpose as Prime membership: acquire customers' loyalty and tying them to Amazon. In Image 3.3 we can see how little were Amazon's profit compared with the revenues and the source of these revenues.

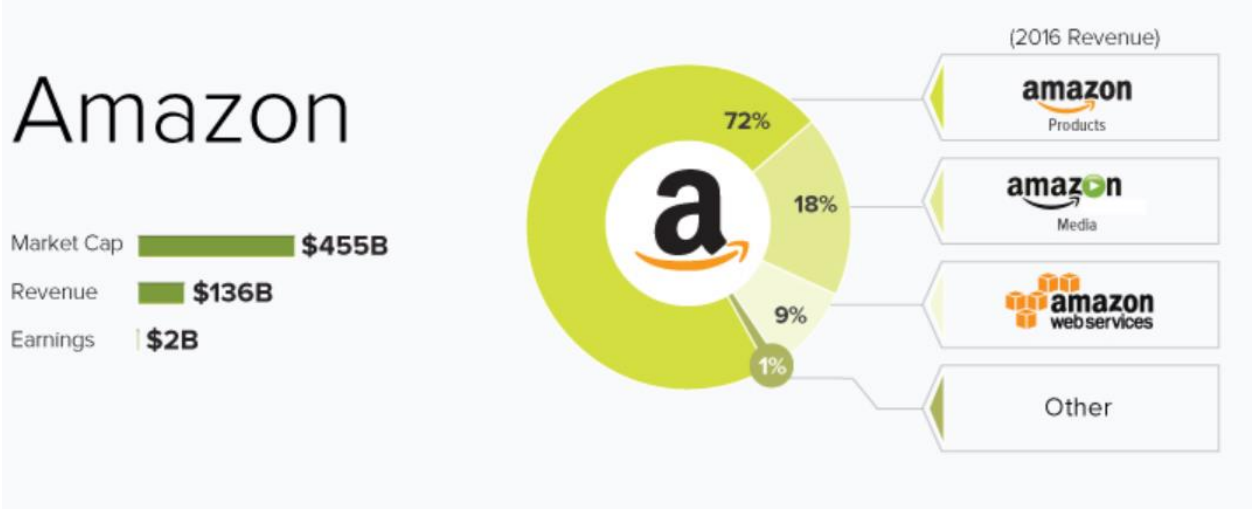

Image 3.3 Amazon's revenues in 2016. [23]

Amazon's strategy was also to expand in **different business areas**: the company is not only an online e-commerce platform, but also a delivery and logistic network, a movies' producer, a book publisher, a provider of cloud space and so on. This expansion was achieved in great part by acquiring other companies: Amazon's presence in so many related businesses make the company a sort of rival of his customers. For instance, the vertical integration into book publishing make it possible for Amazon to leverage other publishers to make them pay more fees to use the platform to sell their products – otherwise Amazon would prioritize his own books in its platform. The customers' loyalty to Amazon gives the company a **bargaining power** so strong that its competitors are forced to do business with Amazon, even at high prices. If you want to sell something, you have to be on Amazon: on Marketplace, Amazon charge fees from 6% to 50% to third-party sellers that want to sell their product through the platform; at the same time, the company has developed his own products. Amazon's tactic with Marketplace is the following: the company tracks sales and test the success of third-party sellers using its platform, using this information to itself develop products that compete with the third-sellers' most popular ones, with lower prices and better ranking on the website research. In this way, third-sellers bear the initial risk and pay a fee to Amazon for selling their product, while Amazon, by tracking these products, produce and sell its own products only once they proved successful. Another example is the delivery business: given that for third-party delivery companies collaborating with it Amazon was important for their business, they allowed the company a 70% discount over regular delivery prices. On the other hand, to make up for the discount, they raise prices for independent sellers. At the same time, Amazon started vertically integrating into the delivery business, offering a lower price than other companies – that, of course, were keeping high prices because of the discount they gave to Amazon. From there, Amazon created a logistic empire, building fulfillment centers, warehouses, in order to offer same-day delivery to its customers – free for Prime members. [21]

Amazon managed to become one of the most valuable company in the world using this strategy, at the same time it managed to avoid scrutiny by antitrust authorities, since for antitrust vision of anticompetitive conduct (that we will discuss in chapter 4) the company wasn't doing anything wrong.

3.2 Apple

3.2.1 History

Apple is an American multinational company that design, manufactures and sells personal computers, software and consumer electronic, concentrating in unique designs. It was founded in 1976 as Apple Computer Inc by Steve Jobs and Steve Wozniak: the two built together a circuit they called Apple I, that lacked some basic features like a keyboard or a power supply: they sold two hundred of them and then moved on with Apple II. Apple II was released in 1977 and it had a completely redesigned interface, it was easy to use according to Jobs' willing to make it possible to use by anyone.

In December 1980 Apple went public with an offer of 4.6 million shares at $22 each. Even if that year the sales of Apple II almost doubled, the company was under pressure for the development of Apple III, that was finally released without adequate previous testing: it was never sold as the previous one. Despite this, the company went on investing, expanding and developing and by the beginning of 1982 650,000 Apple computers had been sold in all the world and the company was the first to reach $1 billion in annual sales. In 1984 the first Macintosh was launched for a price of $2,495: Apple sold 70,000 of them in the first 100 days but after the positive start sales dropped and internal disagreements lead to the dismissal of Steve Jobs. Jobs was obsessed with the implementation of a close system, while Sculley pointed it as the cause of the sales dropping. In the next years, with Sculley, Macintosh and its new versions had great success, and by 1988 more than a million of it were sold. Apple became a global brand. The main competitor of the company was IBM, that from 1991 – with the introduction of Windows 3.0 – filled the gap with Apple regarding the usability. Even if Apple had all the chances to be the leader company in its field, using a close system was a limit that didn't allow it. IBM was a valid alternative and had an open system, more flexible for the customers. Apple's strategy was to give something rare and precious to his customers, that were willing to pay a premium price for it: scarcity and luxury were Apple's strength. Sculley decided to compete with IBM and to offer low-cost computers as well, and in 1990 Mac Classic was out for a price of $999. In the meantime, he made a partnership with IBM to create a new operating system. Despite these changes, Apple's gross margin lowered substantially and in 1993 Spindler became the new CEO. Spindler broke the tradition by giving the license of Apple's technology to outside firms, allowing them to create Mac clones. He cut costs by 16% and invested millions in the project with IBM – that didn't go further – but Apple was losing more and more market shares. In 1995 he made the big mistake of overestimating the demand of the new release Power Macintosh and Apple remained with $1 million of unfilled orders. Spindler was replaced with Gilbert Amelio, that made the decision of buying NeXT – founded by Steve Jobs after he left Apple – and hired Steve Jobs as his personal advisor; two months after he became interim chief executive officer. Jobs immediately revoked the licensing agreement that allowed Mac clones and eliminated 15 out of 19 products from the company line: from 1997 Apple would focus only on professional Macintosh. [24,25]

In 1998 Apple launched iMac that sold 6 million units in three years. With Jobs the company decrease his inventory and invested in research and development. But beyond that, with Jobs Apple wasn't only a computer company, it was a worship. [25] A kind of meta-scarcity was the company's strategy: every product that was produced appeared like an icon, something not everybody can afford and that makes special who owns it. Apple means quality, security, usability and extremely unique design. And the thing that made most successful this strategy for the company was that – unlike other companies that sell luxury product in other fields – it had low-cost production. [18] Thanks to Jobs Apple returned to be a profitable company: in 1999 sales grew by 3,2% and profits doubled. In 2000 Jobs became CEO and in 2001 was the launch of iPod that was a huge success: the customers could choose between different model in a range of prices between $49 and $499 and analysts estimated that the cost for an iPod sold for $249 was $127 for Apple. A key in the development of iPod was iTunes Music Store: Apple launched this online service in 2003 in order to give the possibility to his customers to buy songs for $0,99 and put them on their iPod. The initiative was approved thanks to the Fair Play mechanism that prevented piracy giving the possibility for a song to be reproduced only in five different devices. In 2007 the combined sales of

iPod and iTunes represented more or less the 45% of the company's revenues. In the same year the company released Apple TV, that allowed to watch shows previously downloaded with iTunes on television, and iPhone, a bet that combined iPod and mobile phone service. But the very purpose was to reinvent the mobile phone: iPhone was a success and in 2008 a new version was released, iPhone 3G, along with Apple Store, where it was possible to buy application for the mobile phone. In 2011 the iPhone 4GS was launched with Siri, a voice control friend that answered every question: four million were sold within the first weeks. [24,25] The iPhone soon became a cult: at every new released, customers were not only willing to spend a very high price for it - even if they couldn't afford it – but the first days of a new release Apple Store were filled with lines of customers, that waited for hours and hours to be between the firsts to buy it. [26]

On October 5, 2011, Steve Jobs died, and this signed the end of an era for Apple. [27] The death of the company's founder made only its reputation and appeal increase. Tim Cook became the new CEO: with him in 2015 Apple Watch was released, while other products had primarily upgrades than design changes. [28]

3.2.2 Business strategy

Apple's strategy has two main elements: the **integration of hardware and software** implementing a closed system and **the establishment of a strong brand** in the luxury market maintaining low-cost production. Apple wasn't born as a multi-sided platform: the company took this road from 2003 with the launch iTunes Music Store, two years after iPod was launched. You could buy the hardware (iPod) where you wanted, online, at Apple Stores, in electronic stores, but the content was only available on the official Apple online Store. Apple had control not only of the hardware but also of the user interface, **iTunes Store** – the only place where you could buy songs for your iPod. This was what made the iPod very profitable for the company and signed the beginning of an era: the development of iPod/iTunes platform gave Apple an incomparable advantage over its rivals in consumer electronic, since no one before included a digital content to a new developed electronic product. The integration of content (software, apps, media…) and hardware (iPod, iPhone, Mac..) was the strategy Apple continued pursuing to grow. Apple's closed system produce lock-in effects to the consumers, because of the high switching costs, since Apple content only matches with Apple hardware. By 2010, 92% of Apple's revenues came from platform-based products. In Image 3.4 we can observe the sources of Apple's revenues from 2016.

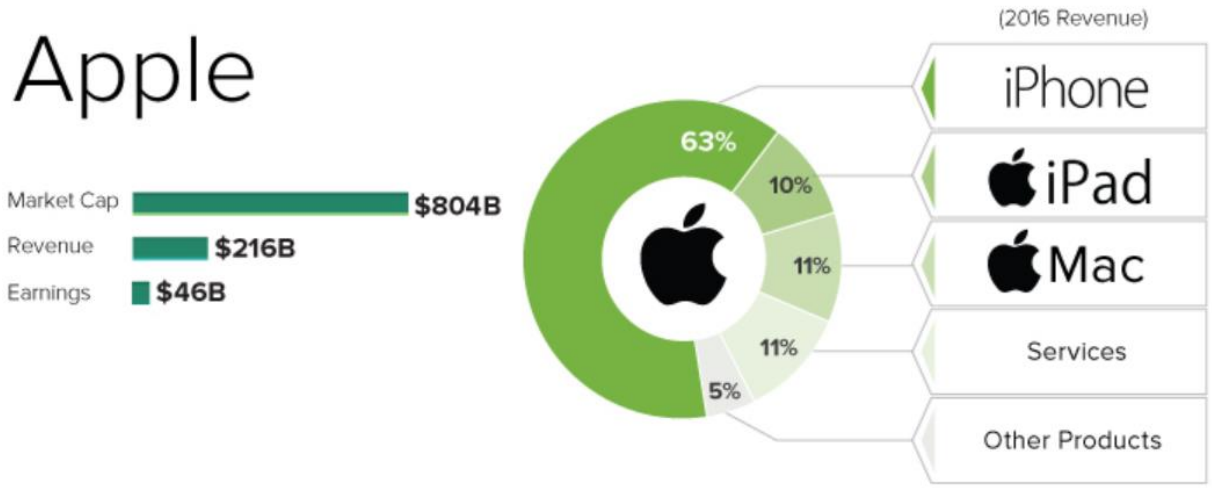

Image 3.4 Apple's revenues in 2016. [23]

This strategy was replicated with **App Store** in iPhone – and after iPod touch and iPad - from 2008: app developers can create and license to Apple their creation and Apple provide the platform for them to reach the consumers. App developers can retain the 70 per cent of the revenues while Apple, without paying for the creations of the apps, enjoys big part of the successful ones. The integration of hardware and software kept one being pursued also with iPad, Apple TV. [29]

The other strength point of Apple's strategy is the luxury brand pricing combined with a low-cost production. Apple's manufacturing and assembling is done mostly in China and shipped in distribution centers all around the world. The company achieved the goal by a strong marketing strategy, focused on consumer experience: owning an Apple device is part of the consumers' lifestyle, that feel special and exclusive because not everyone can afford paying a premium price for the Apple experience. This "scarcity" is what make Apple's luxury brand so different and makes the customer feel unique. Success in luxury is due to a particular attention on design, every detail is cured and the presentation is extraordinary, and to the simplicity of use of Apple's devices, that create a sort of dependence into the customers. [18]

3.3 Facebook

3.3.1 History

Facebook is an American social networking company that designed the social network website facebook.com that counts 2,23 billion of active users in the world, founded by Mark Zuckerberg. [30,31] Mark Zuckerberg was a computer science student at Harvard, with a passion for creating websites. In October 2003 he developed Facemash, an application that compared faces of Harvard's students, whose pictures were taken from the directory of their fraternity houses. The site was shut down by Harvard administration and Zuckerberg risked being sued for privacy and copyright violation. Zuckerberg found a solution with Thefacebook.com: in this new website everyone could upload his photo and his information individually and, in this way, there were no privacy issues. He

created the page on February 4, 2004 making it possible only for Harvard students to be members and only four days after more than 650 students subscribed. It became immediately viral in the university and also between the ex-students and in within three weeks it had more than 6,000 users. Soon Zuckerberg was asked to extend the service to other universities and the website became popular, until in the middle of 2004 was incorporated. In September, Facebook added new features: the wall - in which everyone could write something that could be seen from everyone visiting your profile - and the groups – all the users could create one for every reason. Zuckerberg and his team moved to Palo Alto, California renting a facility where working and managing the website. On November 30, after only 10 months, Thefacebook reached one million users.

Image 3.5 Thefacebook. [33]

Lots of investors started contacting Zuckerberg in order to invest or acquire Thefacebook – but he had no intention to sell - until he agreed to the investment of Peter Thiel, who put $500,000 dollars in the company for owning the 10,2% of it, and to Accel that invested $12,7 million with a deal that valued Facebook $98 million dollars. With this last agreement, Thefacebook had enough money for keep on growing and improving. In the summer of 2005 Zuckerberg and his team acquired the Internet domain Facebook.com in order to change the name of Thefacebook into Facebook: in the autumn of the same year, 85 percent of American students had an account and the 60 per cent used it daily basis and Facebook reached 5 million users. In the same period Zuckerberg decided to leave Harvard university to dedicate entirely to the company. With the beginning of 2006 Facebook ceased to be only a university phenomenon and started to be available for everyone up thirteen years old. Users usually clicked 230 million pages from Facebook ads, and this was the main source of revenue of the company. In 2007 Facebook had spread in all the world and more than a half of the users were not Americans and on October Microsoft bought a 1,6% share for $240 million, giving Facebook a total value of 15 billion dollars. Facebook ads were the most effective ones since were based on the individuals interests and behavior: users were autonomously providing data about themselves to the company, that was able to use it in order to show ads about what could most attract their attention. Thanks to this, Facebook's main source of revenue kept on being advertising, and the advertising industry was more and more relying on Facebook: in 2009 Facebook showed 53,000 million of ads, the 14% of all the virtual advertising. Facebook kept on spreading in the world and reached 350 million users in 2009, growing at a rhythm of 1 million users per day. [32]

2012 was an important year: Facebook acquired Instagram for $1 billion and in February the company came public and the IPO raised $161 million. In 2014 Facebook bought WhatsApp for $19 billion. By 2017 the company had reached 2 billion users. [33]

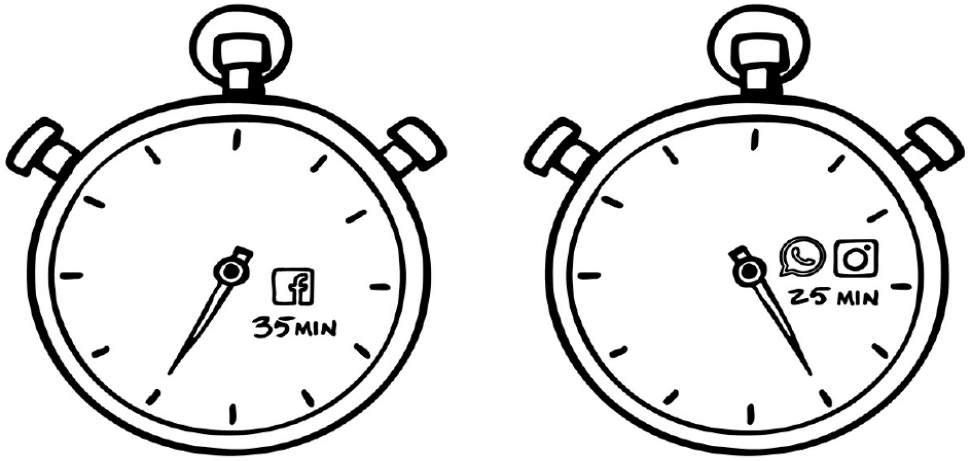

Image 3.6 Time spent on Facebook, Instagram and Whatsapp par day, December 2016. [18]

3.3.2 Business strategy

Facebook's strategy comprehends the **focus on user experience** and the growth by **monetization of users' data**. It started in college communities, where it was easier to spread since for younger people relationships and social life are more important and from the beginning its purpose was to give people a way to connect with each other in a sort of parallel dimension. Facebook offer the possibility to create a network of friends, showing them your virtual life and looking into theirs: Zuckeberg understood the people's need to be appreciated, to interact with other people to feel accepted. Everyone is looking for attention, with Facebook – and Instagram – people can achieve it, posting photos or stories about their life, sometimes creating an online alter-ego with a life they want to narrate to their friends' network.

The social network rapidly spread being available for free for everyone, the only thing it asks in return is users' data. The data is used to get revenues by selling it to advertisers. Facebook is able to register a detailed portrait of its users analyzing their "Like" clicks, their posts, and friend network. As we can see from Image 3.3, Facebook's revenues are almost all coming from advertising.

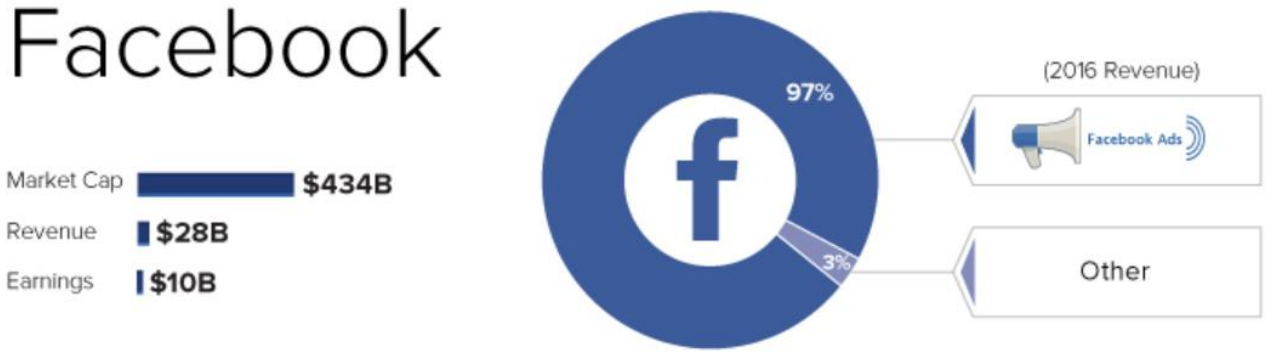

Image 3.7 Facebook's revenues in 2016. [23]

With the acquisition of Instagram and Whatsapp, the amount of data Facebook is collecting about its users raised exponentially. Facebook is always finding more ways to expand its audience to collect and monetize data: its recent introduction of Marketplace – where you can sell or buy stuff to and from other users – aims at increasing the users' experience, directly competing with eBay features.

3.4 Google

3.4.1 History

Google is an American multinational technology company specialized in internet-related product and services, founded in 1998 by Larry Pages and Sergey Brin. [34] They were PhD students in Standford University and they started to work together in 1995 becoming friends. Both of them thought that the search engines available in that period were not good enough: they started design a new way to give relevance to a website, basing on how many links connected the website with others, and they called this algorithm PageRank. Brin and Page created a search engine that exploited this algorithm and spread it in the university: they called it Google from the word "googol", a very big number.

Image 3.8 Google beta version. [34]

At the beginning, the two friends weren't thinking of creating a company – they try to sell the algorithm to existing search engines indeed – until in September 1998 they officially founded Google Inc. They were already situated in the Silicon Valley environment, so the steps were easier; in 1999 they moved to Palo Alto and while the website was still in his demo version, PC Magazine put it in the list of the 100 best web pages and search engines of the year. In June 1999 they declared a 25 million dollars investment by Kleiner Perkins and Sequoia: now the money to continue growing was enough. At the end of 1999 Google counted an average of 7 million researches par day, but the revenues were really low since it was a free service: the founders didn't think one-click advertising or ads were the right way to gain money since customers were interested in their research when using Google. They finally agreed to add to mix the traditional results of a search some ads and after some months developed a strategy to gain more from it: they used the same algorithm applied to the researches to the ads, in this way the more clicked ads compared in

the beginning of the page. On June of 2000, Google made an agreement with Yahoo! that started using the search engine for his results: this was a big step since Yahoo had an important position in the web. In the beginning of 2001 Google was registering 100 million researches par day, 1,000 per second; in the same year Google launched Image Search, that provided research by images. In 2001 Eric Schmidt went to an interview with the two founders and they recruited him to run their company. In 2002 America Online – with his more than 34 million of subscribers – adopted Google as a search engine and this made the company extremely famous. In 2003 almost all the world made researches on Google every day, in one hundred different languages: teenagers, students, investors, attorneys, managers, CIA agents, all kind of people were using Google every day for millions of different reasons. In 2004 Gmail - the Google mail service - went out, it offered one GB of free storage to every user. Moreover, Larry and Page put ads also on Gmail and this caused critics among who claimed that this was an invasion of privacy: for them, Google was using the mail content to exploit information on the users and choosing ads specifically for them. All the critics only gave more notoriety to the feature that started being used by more and more people. [35] In February 2004 Yahoo! dropped his partnership with Google and created a search engine of his own. In August 2004 Google went public and the IPO raised $167 million and his value was $230 million and in 2005 announced Google Maps. In 2006 Google acquired YouTube, video-sharing website, for 1.65 billion dollars. In 2008 the browser Google Chrome was created, and Google also developed Android, a mobile operating system. In 2011 Google launched Google+ and bought Motorola Mobility for $12,5 billion. Google ranking system was updated during the years and became always more complex. In 2015 Google became a subsidiary of Alphabet Inc. after a corporate restructuring. [34]

3.4.2 Business strategy

When Google (Alphabet) was born, there were already lots of search engines in the market. Google grew quickly simply because it was better than the others. In fact, thanks to **PageRank**, its algorithm that ranked websites in the search results counting how many link redirect to that website and their quality. Page and Brin assumed, while developing it, that the more links a website receive from other ones, the more it is relevant. The innovative algorithm made Google very popular in little time and gave it credibility: exponentially, everyone was starting to use Google Search instead of other search engines. But then, Google become more than a search engine. The main strategy of the company has been the **diversification in different business areas**: although it remains prevalently an advertising-based platform – 90% of the company's revenues derive from advertising as Image 3.8 shows - it offers different products and web services (YouTube, Chrome, Gmail, Drive, Maps…) and for example it entered also in the operating system market (Android) and in the consumer electronic market (Pixel, Nexus).

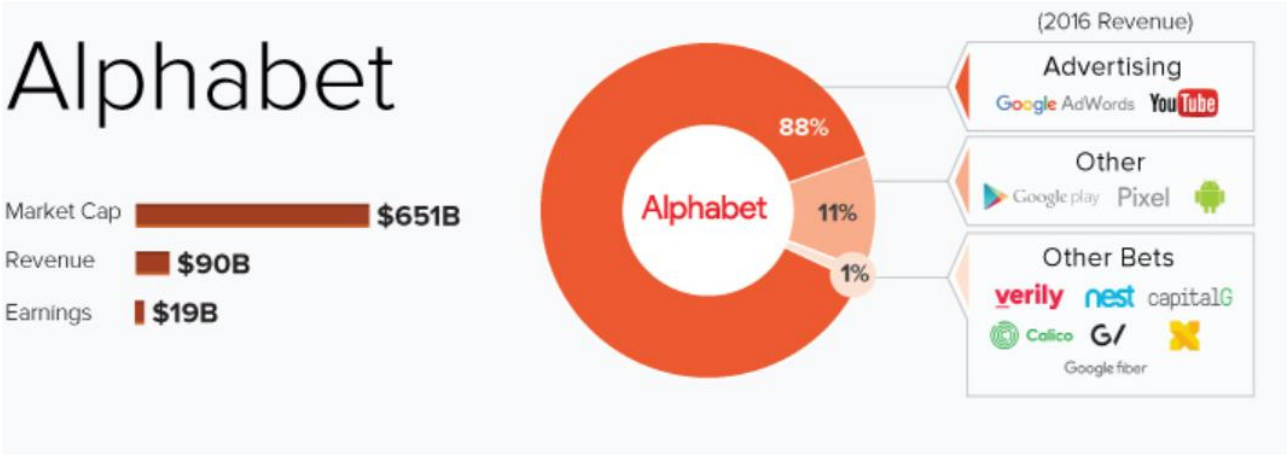

Image 3.8 Alphabet's revenues in 2016. [23]

The simply interface, with primary colours, and the "Don't be evil" motto aroused sympathy in people. The **minimalism** offered in the home page contrast with other competitors and is exactly what people are expecting from a search engine, where they want to look for something quickly. Google managed to become the most **reliable** thing in the world: everyone, everyday, ask Google something and trust its answers: Google accomplished to make itself as a public utility. Google is not merely selling users' data to advertising companies: with AdWords, advertising is correlated with the users' researches so that ads become useful and relevant for the user and it is more likely that they will click on them; with AdSense, third-party website can make money by displaying Google ads. In this way, Google integrated its main source of revenue (advertising) with the main service the company offers (search engine). In addition to this, Google considers also users' personal data when choosing which ads to show: in fact, analyzing what we search on the website and -if we use them – services like Gmail, Gmaps, Google knows more about us than what we think. With the advertising generated revenues, Google kept on expanding with new monetizable services/products that often become a new source of revenue and allow the company to keep on growing.

3.5 GAFA's dominance: challenges to competition

Google manages the world's information, Amazon dominates the world online purchasing, Apple the world's connectivity devices and Facebook the world's social connection. They manage to reach this scale in e very short window of time, thanks to the power of Internet.

This quick and big growth attracts the attention of the European Commission – EU institution with executive power, responsible also for competition issues - because their increasing dominance is raising concerns about competition and data privacy and this is becoming an important issue in these years. EU focused more on the two pure digital giants – Google and Facebook – opening cases against them, that will be discussed later. On the other hand, even if US regulators don't seem particularly concerned, the problem is being discussed lately also in USA.

But Antitrust authorities are not the only one that reacted to the increasing growth of GAFA: also, some government began to be concerned about the range of information that digital companies can reach and the political and social implications of their size. In particular, fake news spreading over Facebook and Google raised concerns in governments because this could mislead the judgment of

people and influence their political choices. UK government is investigating about a possible Russian influence in Brexit vote by using Facebook's platforms in order to spread fake news and accused WhatsApp (owned by Facebook) to be a "*secret place for terrorists to communicate with each other*", asking access to WhatsApp encrypted messages. In August 17, Germany implemented the so called "NetzDG law" that fines 50 million of euro social platforms that don't remove hate speech, fake news and illegal material within 24 hours. [25]

3.2.1 The importance of data

GAFA became the most valuable companies in the world thanks to the advantages of being platforms, as we discussed in chapter 1. They are now sustaining their position by habituating users with their services, improving them and keeping on collecting personal data from them.

Data is becoming really important in the economic context, it is considered the new currency of the digital age: lately, the term "**Big Data**" is being discussed and it refers to the capacity of managing, store and use large amount of datasets in order to extract useful information. Big Data technology are used to improve and optimize business processes, but at the same time Big Data pose some economic challenges. Thanks to data, users' behavior can be studied, companies can analyze an user's data and extract his willingness to pay, being able to adopt individual pricing. In this way, it is possible to actuate a model of price differentiation based on the individual, and this can be a disadvantage for some customers. GAFA companies are able to collect data like no one else: Apple and Google control one mobile operating system – respectively iOS and Android – while Facebook control the largest social network platform, plus all the messages exchanged via WhatsApp and the stories posted on Instagram. Amazon control the largest online shopping platform, and Google also can collect data from the most used browser – Google Chrome – collecting cookies about the websites we visit and the purchases we make. Great part of users are unaware of how digital platform are collecting and evaluating their data and data protection law are not very developed.

The European Commission until now only considered the impact of a greater data concentration on the advertising market – for this reason mergers like the Facebook/WhatsApp one in 2014 were allowed. Data and privacy are not to be considered a competition issue, but a data protection one, for this reason the merger was approved. But it must be taken into account also the impact that controlling this amount of data has on the customers' welfare. [26]

3.2.3 Political implications

Among data protection issues, one important consequence is how politics is being affected by digital monopolies and the big amount of data they own. Users' data importance is confirmed by the consequences it had in **recent political elections**: in particular Facebook data of more than 50 millions of users was stolen by Cambridge Analytica – a Britannic political consulting firm – that worked with both winning Brexit campaign and Donald Trump's election team (2016). The data was collected without authorization through an app called "thisisyourdigitallife" where users were paid to take a personality test and agreed to have their data collected for academic purposes; the app was also collecting users' friends data. The data was then analyzed to study users' personality and voting behavior, in order to target possible swing voters with programmed advertising and

psychological techniques. [36] Facebook was accused to be responsible of the data leak, lost market share and on April 18, 2018 the company updated its privacy policy. [37]

Another discussed issues is the spreading of **fake news** in both Facebook and Google platforms: fake news lead to disinformation and can distort political orientations. Both the companies agreed with UE to fight this phenomenon with a voluntary code of practice ahead of the 2019 EU elections. [38]

4. Competition authorities and case studies

Competition laws have the purpose to protect the consumer by ensuring fair competition between firms ad avoid abuse of market power. When a potential anti-competitive conduct is detected, Antitrust authorities intervene to investigate and eventually intervene. In this chapter, after giving a picture of the antitrust environment and its regulatory framework, we will discuss some of the closed investigations and current investigations opened by antitrust authorities against digital platform companies, focusing on GAFA.

4.1 Antitrust in the world

Antitrust authorities are active in both US and Europe, but they have different views about competition, especially regarding digital platforms and their growth.

4.1.1 US Antitrust

There are two government agencies in US that share jurisdiction over digital platforms' competition issues. The first is the Department of Justice, that has the authority to investigate and sanction anticompetitive conducts; the second is Federal Trade Commission (FTC), which has the responsibility for consumers' data and privacy protection.

US Antitrust follow **Chicago School of economics'** view: it rejects the structuralist model and its main argument is that **price of goods** is what antitrust authorities should control. "*In the words of Richard Posner, the essence of the Chicago School position is that the proper lens for viewing antitrust problems is price theory."* [21] According to this theory, market power held from one or a few companies doesn't mean necessarily harm for the consumer; on the contrary it promotes efficiency and economies of scale and can give benefits to the consumers. Moreover, there is a faith in the market regulating itself, in fact, as Khan points out *"the Chicago School presumes that market outcomes—including firm size, industry structure, and concentration levels—reflect the interplay of standalone market forces and the technical demands of production"*, so "*market power is always fleeting—and hence antitrust enforcement rarely needed".* [21] In this context, digital platform are not pursued by US Antitrust, since their business strategies are based on low prices for consumers to acquire audience and satisfy the other side of the market. On the contrary, there is lots of criticism from US towards latest EU Commission's decisions about digital platforms, that we will discuss in the next sections.

4.1.2 EU Antitrust

In Europe, antitrust issues are regulated by the European Commission. EU Antitrust has a different approach, more interventionist than the US one, in particular regarding digital platforms. In the last years, several cases against online platforms were open – Google was particularly targeted – and a new policy about privacy (GDPR) was released in the last year.

The European Commission is concerned about the outcomes that could come from digital monopolies' power and the fact that current antitrust rules sometimes are not effective with these companies.

4.2 EU Regulatory framework

The legal basis of the investigations pursued by the European Commission about competition are principally the articles from 101 to 109 TFEU and the EU Merger Regulation.

We will analyze the regulatory framework mainly used by EU Commission, that are the **Articles 102 and 102 TFEU** and the **EU Merger Regulation**, and the difficulties in applying it to online platforms.

4.2.1 Article 101 TFEU

Article 101 "*prohibits restrictions of competition through **coordination between competitors**, regardless of their form. The prohibition applies to both vertical and horizontal relations, as well as to relations with parties that are active outside the market where the prohibited behavior occurs but that contribute to the infringement".* The application of the Article 101 *"requires initially the existence of coordination in the form of agreement, decision or concerted practices. Once coordination has been discovered, the qualification phase consists of establishing whether the coordination has the object or effect to restrict competition"*. [39] In absence of justifications or exceptions, the prohibited behavior is sanctioned according to its gravity. This process, even if it was widely used by the Commission in various circumstances, presents some application difficulties with online platforms.

4.2.2 Article 102 TFEU

Article 102 prohibits the **abuse of a dominant position** that has the effect of restricting competition. The abuse is divided into exclusionary conducts and exploitative abuses of dominance: the existence of a dominance has to be proven, by **defining the relevant market** and **assessing the market power** of the company to determinate its dominance in such market.

Under the 102 TFEU fall also the illegal practices of tying and predatory pricing. Tying refers to a situation where a seller agrees to sell a product – the "tying" product – only if the buyer accept to buy another product – the "tied" product. An example is Google Android case (see 4.3.2) but this practice is utilized in different and multiple ways from online platforms and it is difficult to detect it. In a market where the tying and the tied product are offered for free it is difficult to demonstrate that there is an anti-competitive conduct. Predatory pricing**,** that is pricing below cost to drive competitors out of the market, is also often used by online platforms, and it is difficult to detect since the access to most platforms is free of charge and the cost sustained to offer a free service is retrieved from the other side of the platform. The traditional test consider as predatory a price lower than average variable cost (AVC) and it is not applicable with online platforms, since the entire pricing structure of the platform should be considered, not only the side that presents a suspicious price, because in that case all platforms that provide a service for free to consumers should be considered predatory. Anyway, online platform have numerous ways to predate through pricing: their dynamic and discriminatory pricing structure gives them numerous possibilities, like personalizing prices or modifying their price structure once they gained enough audience and locked in enough consumers in order to keep away new entrants. [39]

4.2.3 EU Merger Regulation

The EU Merger Regulation prohibits mergers and acquisitions that could potentially reduce competition and ensures that firms don't acquire a degree of market power that could allow them to harm consumers by raising prices. There are some **turnover requirements** to meet in order to fall under the regulation, so that small mergers are not regulated. This cause a problem in the digital economy since many platforms' business models implicates little revenues even if the company has great value and market capitalization (for example WhatsApp).

Online platforms that are dominant in the market often acquire innovative companies: it is important to control these mergers to ensure they would not be a threat to competition. The fact that digital platforms often acquire potential innovative platforms that have little revenue (they are free for users) has the consequence that sometimes mergers avoid scrutiny.

4.2.4 General Data Protection Regulation (GDPR)

The **General Data Protection Regulation** (GDPR) was agreed on 15 December 2015 and it is active from 25 May 2018. The precedent Data Protection Directive, that was active from 1995, according to EU wasn't able to adapt to the new digital economy. GDPR is applied to all companies that process personal data from EU residents, even if the company is based elsewhere. With GDPR the definition of data was expanded including data collected through cookies, location tracking and other identifiers, and the consumer have now to give explicit consent to the utilization of his personal data before entering in a website. Moreover, users have now the right to receive the personal data regarding them and eventually move it to another provider (data portability) and to erase its personal data from the data controller (right to be forgotten). These two new possibilities, in particular, are a big step ahead and could make it easier for consumers to switch platforms and for new entrant to compete with incumbents. The fine is up to € 20 million or 4% of the revenue for online platforms that fail to obtain explicit consent from users.

4.3 Problems detected in applying the regulation to digital platforms

Competition authorities incur in some challenges when they have to apply the regulatory framework to digital platforms. In particular, in order to apply Article 101 TFEU, the problems detected are: **proving a collusion** is more difficult with online platforms and it is difficult to determinate if the collusion has the consequence of restricting competition **by object or by effect**.

In the process of detecting an abuse of dominance applying Article 102 TFEU, the main problems are: the **definition of the relevant market** is more difficult for online platforms, their dynamic nature is not compatible with the technologies used for assessing market power and it is very hard to **distinguish** between a business strategy and an anti-competitive conduct.

4.3.1 Article 101 TFEU: Establishing collusion

The first requisite is the establishment of collusion: for this reason, "*its application is limited to cases involving a form of human decision-making process. In absence of the human aspect, these thresholds cannot be met".* Alternatively, the term "*concerted practice*" is also included to cover form of agreements that don't show enough intensity. To determine the existence of a concerted

practice "*a form of contact must be proven as well as common conduct on the market resulting from such contact",* [39] a contract to which both parties expressly agreed: it is necessary to prove a contact from one party to the other and awareness by the receiving one. This can be difficult with online platforms, because the factors of contact and awareness are not easy to demonstrate. For example, thanks to technological innovation, online platforms can use automatic pricing and monitoring software that, by monitoring the conditions of the market, instantly adapt the prices. These software are mostly by e-commerce platforms and result in parallel pricing, but the resulted price collusion comes from unilateral decisions and can't be classified as an outcome of contact between competitors. The use of such tools should be better regulated in the Article 101 TFEU. The Commission is becoming aware of the problem: in fact, recently, four consumer electronic firms - Asus, Denon & Marantz, Philips and Pioneer - were sanctioned for using this kind of software to adjust prices (see 4.9.2). An example of how digital platforms exploit the use of these software can be done also with non e-commerce companies, like Uber. The price for a ride with Uber is not fixed: the firm uses an algorithm that adds an additional price to the ride (surge price) when a raise of demand in a particular area is registered.

Another problem is proving the awareness of the receiving party; this is really hard with online platforms so "*one may wonder whether this burden of proof requirement is workable in the context of digital communication".* However, *"at the same time, removing the requirement of awareness from the equation would imply that any form of contact between competitors is sufficient to lead to a presumption that participation in concerted practices has taken place when the dispatch of digital messages between competitors can be traced*". [39]

However, price is only one aspect of competition when it comes to digital platforms. A parallel market conduct that is not the result of an explicit collusion can be seen in the way online platforms that offer a free service to consumers manage users' data: the non-price collusion, in this case, includes non-price parameters. These parameters should include the quality of the service the platform offers, like terms and privacy policies. It is very difficult to detect a concerted practice comparing privacy settings, since the platforms can be offering very different services to consumers and then not be considered competitors by the traditional analysis.

4.3.2 Article 101 TFEU: Restriction by object or effect

Once a form of collusion is established, the next step is to determine if this collusion has the consequence of a restriction by object or by effect. In the first case, a restriction by object is an anticompetitive conduct per se and it is not necessary for further investigations or proofs. Anyway, there are some obvious object restrictions and some that must be analyzed more. With online platforms it is more difficult to find non-obvious object restrictions: being multi-sided platforms with network effects, every action on one side impacts the other one and the tests usually applied to assess restrictions by object can't be used. These markets are still unknown and it is hard to find an object restriction in absence of established practices that are known to be anticompetitive in these kind of markets, without obvious evidences of competition harm.

For this reason, it is usually better to adopt an effect-based approach towards online platforms: this procedure takes more time and resources, since the single effects of a conduct have to be studied, but it is necessary to proceed in this way to accumulate experience and information about these businesses.

4.3.3 Article 102 TFEU: The definition of the relevant market

The first step is defining the relevant market in which a company operates: the relevant market is defined as the smallest market, in competitive and in geographic terms, that contains all the product that are substitutable for the consumer. This procedure is more difficult when the investigated company is a digital platform: since they operates in multi-sided markets more than one relevant market is involved. If a platform operates in multi-sided markets and one of these markets is a non-transaction market, that means there are no direct transaction between users, it could be overlooked even if relevant. For example, we know that Google provide a free search engine to users by charging advertising companies, and when users use Google's platform they don't interact with each other nor with the advertisers; anyway, both the market for online search that the market for online advertising are relevant markets in which the company operates, so there is more than one relevant market that should be taken into consideration. Moreover, new concepts and instruments should be introduced; in fact, the definition of the relevant market is usually done with the SSNIP test, that identifies the smallest market in which the monopolist can raise its product price by 5% without leading its consumers to substitute it with a competitive product, that is not applicable for digital platforms since they offer free goods. The reliance on price bases indicators like SSNIP test is weak in a market where the price is paid with non-monetizable users' data.

Finally, because of the sprint given by innovation and the dynamism of digital platforms the definition of a relevant market like something bounded by limited borders should be put into discussion: market borders in the new digital economy are blurred and they're always changing.

4.3.2 Article 102 TFEU: Proof of dominance

After defining the relevant or relevant markets, the dominance in such markets has to be proven. Usually, the assessment is made through static indicators like market shares, concentration ratios, and so on. Market shares, for instance, are often used to detect a dominant position: even if high market shares are not sufficient to imply a dominant position they are an important tool. The problem with digital platforms is that being **dynamic market** it is difficult to calculate their market share and, even when correctly calculated, they can suffer great changes in a small period of time. Moreover, online platforms are active in more than one market with a different market share.

All these problems lead to the conclusion that different criteria should be utilized to determine if an online platform has a dominant position. In particular, there are some indicators that should be taken more into consideration: **entry barriers**, companies' **business models** and **degree of innovation**. The entry barriers to be considered are: network effects, economies of scale, multi-homing and collection of data. We already discussed how these characteristics are the most important in the digital economy: network effects lead to exponential growth and can create a first mover advantage, locking in consumers because of the presence of high switching costs and making it very difficult for a new entrant to compete to gain audience; for example it would be very difficult to compete with a social network like Facebook that expanded worldwide, because for users the switching costs to move to another new social network would be very high, after all the data they provided and the list of contact they created on Facebook. Because of economies of scale many users on one side offer more market power to the other side of the platform. Data collection raises concern about privacy and should be taken more into consideration during antitrust investigations: a

market for data should be considered and defined since data is traded and should be discussed whether it is possible to be dominant in this market. Under Article 101 TFEU, agreements could be reached to prevent competitors from access some data; under Article 102 TFEU possession of big amount of data should be taken into consideration when assessing market power and under the Merger Regulation the consequences of combining data from different platforms should be considered (this raised discussion when the Commission approved the Facebook/WhatsApp merger, see section 4.8).

Platforms' business models should be studied deeply, focusing on how they make profits, to better define market borders and to differentiate business strategies from anti-competitive conducts. Their degree of innovation should be considered as well, that means how quickly they are able to adapt to the market trends and creating new trends for consumers. The investments made by online platforms in the Research and Development area gives an idea of how important is to them to pursue innovation in a dynamic digital world in order to avoid losing consumers to eventual more innovative platforms.

4.3.3 Challenges in detecting anti-competitive behaviors

It is very difficult to distinguish between normal business decision and anti-competitive behavior and antitrust' rules are very old and may not be applicable for the kind of market in which digital platforms operates. This is beginning to concern European Commission, since some behaviors, in particular of GAFA tech giants can be considered anti-competitive.

We can examine some examples of how digital platforms' characteristics can lead to an anti-competitive conduct that are difficult to detect and demonstrate. We already mentioned how **mergers** like Facebook/WhatsApp (see section 4.8) and Google/DoubleClick were allowed by the authorities since they didn't seem to pose competition problems; however there is a risk that should be considered when a digital monopoly acquires a company, which is that acquisitions could have the sole purpose to eliminate possible rivals. Moreover, the actual turnover thresholds required by EU Merger Regulation often are not met by online platforms since they offer their service for free and they can have little turnover even if they have great value. (see section 4.8.4) Another anti-competitive behavior is identified in **leveraging strategies**: for example, Google was accused of manipulating search results in order to put advertising partners at the top of the ranking results and the company was charged by EU Commission for abusing of its dominant position in the search engine market to give more relevance to its comparison shopping service (see section 4.4.1 for relative case). The investigation started in 2010 and the final decision was reached in 2017: the fact that the investigation was protracted for such many years gives an idea of the difficulty of applying the Article 102 with an online platform, and makes us wonder about how much the final decision can be useful in terms of competition when reached so long after the beginning of the potential abusive conduct.

Digital monopolies have **lock-in effects** for both consumers and developers: consumers get used to services they use every day and lock themselves in providing personal data, since changing platform could mean to lose it. "*Consumers get used to services they like. Once these services have become an integral part of their daily lives, they are less willing to switch to other services. They are even less willing to switch when the experience of an individual service (e.g. using a search engine) depends on using other services (like email, geolocation services, or social media services.*

The use of personal data profiles causes this effect. Any limits to transferring these data to a competitor impose switching costs for consumers. In a way, consumers lock themselves in by providing their personal data" [4] For example, with Apple's closed system changing your device for a non-Apple one implicates losing all personal data you provided, stored in Apple iCloud and transferable only onto another Apple device. Changing your Gmail account to use a Microsoft one will make you lose all the data related to it, that doesn't comprehend only emails but also all Google services connected with that email account, like photos' archive in Google Photo, documents in Google Drive, and so on.

Predatory pricing – setting temporarily prices below marginal costs - is often used to eliminate competitors, but it is very hard to detect and win a claim of this type since it is necessary to prove that the predator could recoup his losses by raising prices in a narrow window of time. Online platforms are supported by investors so that they can allow themselves to maintain losses even for a long period of time and defer raising prices to recover these losses. For example, Amazon used this technique to drive Quidsi out of the market, cutting prices of diapers and baby products, to stop the growth of Diapers.com – a business recently acquired by Quidsi [21]
Another discussed issue is how multinational companies in general **avoid tax payment** within the boundaries of the law. They do this, for instance, shifting profits to subsidiaries located in low-tax countries even if the revenues don't come from there, by way of transfer prices. This is even easier for digital companies since their asset is mostly intangible and their activity is difficult to track and localize. Apple and Amazon have been bounded by EU commission to give back the money they avoid to pay thanks to these tricks (see sections 4.5 and 4.6.2 for relative cases).
Online platforms can also exploit its dominant position by imposing **vertical restraints** in contracts: these competition restrictions can be of different kinds. The most important are **price restraints** that impose in the contracts some restrictions about pricing, like the price parity clause that guarantee to a platform that suppliers will treat them as favorably as the others (see Amazon e-books case in section 4.6.1 and Booking.com case in section 4.8.1) or vertical price fixing that oblige the counterpart to use maximum or minimum fixed prices (see consumer electronic companies case discussed in section 4.8.2); **tying arrangements** that occurs when a firm uses its dominance in one product to gain market power in another one forcing a third-party to purchase both of them if they want the first one (Google used the tying strategy to abuse of its dominant position with Android, see 4.4.2 for relative case).

4.3.4 Conclusions

We can conclude that the actual regulatory framework has some shortcomings when it comes to investigate online platforms. The necessary requirements imply years of investigation and should be reconsidered in the presence of a new digital landscape. [4,39,40] We will discuss the possibilities for improvement in the next chapter.

We will now discuss pending and closed **relevant antitrust cases opened by EU Commission** against digital platforms that falls under the EU regulatory framework. At the end of every case explanation, we will analyze the Commission decision (or the potential one when talking about still open cases) and the possible consequences.

4.4 Google cases

The cases against Google have been highly debated in the last years: Google's dominance among different markets brought various companies to complain with the European Commission. Two separate investigation were opened and closed judging Google guilty of abusing of its dominant position, one regarding Google's comparison shopping service and the other on the company's handling of pre-installed applications on Android mobile devices. In both investigations, Google's conduct was declared anti-competitive and the company was sanctioned with record penalties. The fine for the Google Android anti-competitive conduct is the highest in history.

A third investigation about Google AdSense service, that is also connected with Google Search, has been opened after the Google Shopping one.

4.4.1 Google Search/Shopping (closed)

EU has been investigating Google regarding Google Shopping issue since 2010, reaching the final decision on 2017. The allegation is abuse of market dominance: being dominant in a market is not illegal but dominant companies have the responsibility not to abuse of their position to grow in another market or limiting competition in any way.

4.4.1.1 Relevant markets

When a user enter a query in Google's search engine, two sets of algorithm are run: generic search algorithm and specialized search algorithm. The generic ones relies on the PageRank algorithm, that measures the importance of a web page depending on the number and quality of links that redirect to it. Generic results can also return sponsored result – that are advertisement results ranked by AdWords basing on how much the advertisement company pays for every click and the quality of the website: Google receives money through pay-for-click system every time a user clicks on one advertisement result. The specialized search result are another kind of results that compare every time a user utilize some specific words. These results are displayed with an attractive design and are positioned before the generic results, and refer to a particular category (for example Google Shopping, Google Flight, Google Finance….). Product and services listed among the specialized result of a particular category are often tied with a paid agreement: Google make third-party website pay in order to compare within the list. This is the case with Google Shopping: this service compare different products and their prices in response to queries, redirecting the user directly to the third-party merchant when they click on the product. Websites that wants to appear between Google Shopping results have to pay a fee to Google.

The Commission identified as the **relevant markets** for this case the one for the **general search services** and the one for **comparison shopping services**. The market for general search services is a relevant market because it constitutes an economic activity – even if users don't pay for the service their data is monetized to improve the service and the relevant ads shown – and has limited demand substitutability with other online services/content sites and also with specialized search services. Indeed, the latter and the market for general search services are complementary as users often use specialized search services only after introducing a query in the general search engine, and other specialized search services don't offer a general search service. Comparison shopping services are

specialized search services and constitute another relevant market because there is limited substitutability between the service and other specialized search ones and the online search advertising market. The service allow users to compare prices and characteristics of different products, providing links for each product that redirect to the website of the online retailer or merchant platform that sells that product. Retailers and merchants have to give Google access to the information on product, prices and data in order to be listed in Google Shopping service: there is also limited substitutability between merchant platforms – like Amazon Marketplace – and comparison shopping market since the latter act as intermediary between users and merchant platforms and compares different products from different platforms, so they are not competitors but rather partners. Moreover, Google allows merchant platform to participate in Google Shopping service, but not competing comparison shopping services and the two services are remunerated in different ways: while comparison shopping is based on a pay-for-click model, merchant platforms get money from commissions or users' purchases. The relevant geographic market for general search services and comparison shopping services are national in scope.

4.4.1.2 Abuse of a dominant position

The Commission states that Google has a dominant position in each national market of general search services since 2008, as: analyzing 2016 data Google hold more than 90% of market share in each european country except for Czech Republic, Norway and United Kingdom (being anyway the market leader); there are high barriers of entry in the market; users that use Google as primary search engine are not likely to multi-home since they trust Google's brand, and they wouldn't switch easily even if Google lowered the quality of his search service.

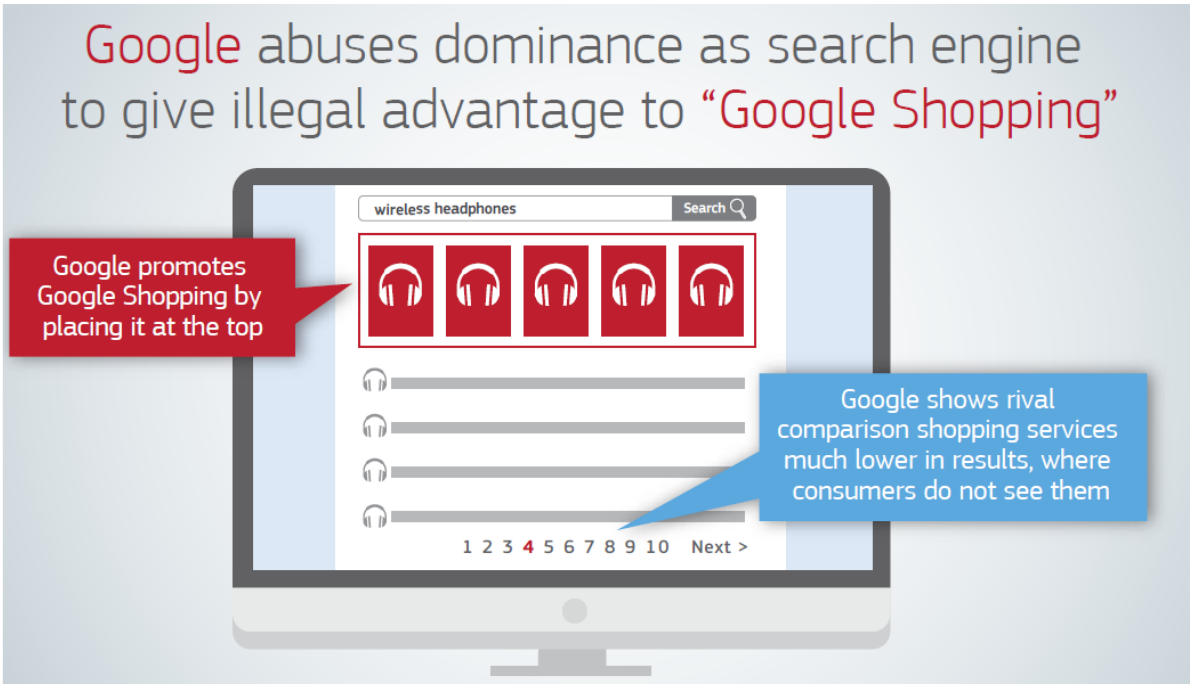

Image 4.1 Google abuses its dominant position . [41]

The abuse conduct is described as the **more favorable position and better design format** of Google's comparison shopping service in Google's general search result page: it is positioned above the normal results as it is shown in Image 3.1. the conduct is anti-competitive because

decrease traffic from Google's general search page to competitive comparative shopping websites, favoring the traffic to Google Shopping. Moreover, competitive comparative shopping websites are ranked in a very low position and this happens since the introduction in 2011 of the Panda algorithm: to support this theory, various researches conducted by European countries shows that from the beginning of 2011 their visibility on Google's search result page has decreased substantially. Otherwise, Google own comparison shopping service is not affected by the same ranking mechanism but instead it occupy the first place in the page.

As Table 4.1 shows, the majority of clicks on the product listed redirect to Google Product Search website instead of to merchants' website. Anyway, Google benefits also from the clicks that lead to merchants' websites since these were the one that subscribed the agreement to be in the Google Shopping ranking. Both link of products listed in Google's search result page and the ones in the standalone Google Shopping website lead to the merchants' website triggering the payment to Google.

Table 4.1 Portion of clicks that led to Google Product Search website and to merchants' website in United Kingdom, Germany, France and Netherlands. [41]

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
34,35 %	16,96 %	11,42 %	7,73 %	6,19 %	5,05 %	4,02 %	3,47 %	2,85 %	2,71 %	1,11 %	<1 %

The conclusion that Google is abusing of its dominant position is supported by the analysis of users' behaviour, evidence of the impact of the conduct on the traffic to the competitive comparison shopping websites and on the one of Google's own Google Shopping. The analysis of users' behaviour shows that they typically look at the first three to five generic results and pay little attention to the following ones. The first ten results correspond to the 95% of users' clicks, and from Table 4.2 we can understand how the results' ranking impact on the traffic to a website.

Table 4.2 Average click rate for rankings from 1 to 12 on Google's search result page. [41]

Moreover, the Commission provides a study that indicates that such results are not depending by

	Clicks that led to the Google Product Search website	**Clicks that led to merchants' website**
United Kingdom	50% to 55%	45% to 50%
Germany	55% to 60%	45% to 50%
France	60% to 65%	35% to 40%
Netherlands	65% to 70%	30% to 35%

the fact that users find more relevant a page that is positioned above others in general search results.

In fact, moving a first-rank page to the third rank reduce the traffic to it by 50%, and moving it to the tenth rank about 85%, proving that users' decision to click on a link only depend from its position in the search results page. The traffic to the competitive comparison shopping websites has consistently lowered, notably after the introduction of Panda algorithm, but also over the longer run. On the other hand, evidence shows that the contrary occurred to Google's own comparison shopping website.

Google claims that the change in traffic should be accounted more to the develop and growth of market platforms like Amazon than to its conduct. The Commission states that if this is the case, then also traffic to Google Shopping should have decreased.

4.4.1.3 Final decision

The Commission concludes that the anti-competitive conduct have effects on the national markets of comparison shopping services and general search services. Google exploits its dominant position in the market of general search services by giving illegal advantage to its comparison shopping service. It has anti-competitive effects to the market of comparison shopping because it has the potential to foreclose competition and this may lead to higher fees imposed to merchants by Google once the competitors are eliminated, that would cause higher products' prices for consumers. Moreover, the conduct can reduce both innovation of comparative shopping market and improvement of Google Shopping quality since it would remain the only choice. Consumers could not be able to access easily to competitors' webpage without being aware of the fact that Google Shopping has a favourable ranking and position.

The Commission concludes that Google should bring to an end the anti-competitive conduct within 90 days from the notification of the decision. The **fine** imposed to Alphabet Inc. and Google Inc. for the abusive conduct is **€ 2,424,495,000**. [41]

4.4.2 Google Android (closed)

The investigation started in 2015 and the case was closed in 2018. The allegation is illegal tying practice by the company.. Often, this practice is used to offer better conditions, but it can be used also for anti-competitive purposes and become a way to abuse of a dominant position to drive competitors out of the market.

4.4.2.1 Relevant markets

Google understood early the shift that had to come from PCs to mobile internet: that would have been a pericolous shift for Google Search. The company had to anticipate the problem and act so that its search engine would be utilized by consumers also in mobile devices. In 2005 Google acquired the company developer of Android mobile operating system and continued to develop it, publishing the code online every time a new version of Android is ready. Being open source, the code can be modified and utilized by everyone, but to make it effective the major part of the companies integrates it with Google Mobile Services (GMS). A company that wish to obtain it must enter into contracts with Google, that imposes a series of restrictions, that are the reason of the antitrust allegations. Android is a multi-sided platform, in particular a three-sided one since it serves

three kind of users: manufacturer uses it as a component for their devices, application developers uses it to sell their apps, and consumers buy the device and the applications.

The **relevant markets** are the market for **general search services**, the market for **licensable smart mobile operating systems** and the market for **apps' stores for the Android mobile operating system**. The market of general search services is a relevant market for the reasons previously discussed (section 3.2.1.1). The market for licensable smart operating system is different from operating system exclusively used by vertically integrated developers – like Apple iOS – since there are not available for licence by third-party device manufacturers: there is then little substitutability between the two of them.

4.4.2.2 Abuse of a dominant position

The Commission states that Google has a dominant position on all three relevant markets. Google has a dominant position in the general search services for the reasons we discussed in the Google Shopping case (section 4.3.1.2).

Google has a dominant position in the market for licensable smart mobile operating systems because: the company's market shares worldwide (except for China) in this market exceed 90%; the entry barriers in the market are high because of the existence of network effects: the more users use an operating system, the more developers write apps for that system; there are high switching costs for Android users who wish to change operating system, since that would imply losing all their apps and data. Moreover, Apple's presence doesn't constrain Google's market power since users' choice are not influenced by the type of mobile operating system, Apple devices are priced higher than Android ones so they're not accessible by great part of Android users and Google Search is the default search engine of Apple's devices so Android users' switch to Apple wouldn't affect Google's core business since they would likely continue to use it for their researches.

Google has a dominant position in the market for apps' stores for the Android mobile operating system: in fact, Google's Play Store accounts for more than 90% of apps' downloads by mobile devices in european countries; it is crucial for manufacturers to install Play Store within the release of their devices and it is pre-installed in the majority of Android devices; it is not possible to download other app stores from Google's Play Store so in order to switch to other app stores users would incur in high switching costs, since they should buy another device with a different operating system.

Three allegations are moved against Google, regarding three different anti-competitive behaviours, shown in Image 4.2.

Image 4.2. Allegations against Google. [42]

The first is the **illegal tying of Google's search and browser app to Android devices**. Google ensured that both its search app and its Chrome browser were pre-installed on Android devices, by bundling the two services with Google Play Store, so that if manufacturers want to pre-install the app store in their device they can't avoid pre-installing also Search and Chrome apps. The conduct is anti-competitive for the Commission, since it reduces the incentives of manufacturers to pre-install competing search and browser apps and of users to install new ones. In fact, users are more propense to use apps that they found already on the device rather than installing new ones. This is proved by the fact that on Android devices more than 95% of all queries were made with Google Search app, while on Windows Mobile devices more than 75% were made with Microsoft's Bing search app. The conduct aims to strengthen the dominant position on the general search services market and affect negatively competition on mobile browsers.

The second allegation is that Google **granted illegal financial incentives on the condition of exclusive pre-installation of Google Search** to the largest device manufacturers and mobile network operators. The Commission investigations shows that it would have been unlikely for a rival search engine to compensate the device manufacturer or the mobile network operator for the loss of revenues' share guaranteed by Google and still make profits. The conduct has been taken on between 2011 and 2014.

The third allegation is that Google has **prevented device manufacturer to develop new open source versions of Android** ("Android forks") for their devices. This conduct has denied consumers access to potential better alternative of Google Android operative system – for example the conduct prevented manufacturers to develop and sell devices equipped with Amazon's Android fork Fire OS. Moreover, Google has prevented competitors to introduce alternative pre-installed apps along with the alternative Android fork operative system – in particular alternative search engine apps.

4.4.2.3 Final decision

The Commission concludes that these three types of abuse are part of a Google's strategy to strengthen its dominant position in the market of general search services when mobile internet was starting to become important. Google's conducts have prevented the development of potential superior Android operating system versions along with related potential superior apps and services, harming competition and consumers.

The Commission concludes that Google should bring to an end the anti-competitive conduct within 90 days from the notification of the decision. The **fine** imposed to Alphabet Inc. and Google Inc. for the abusive conduct is **€ 4,342,865,000**. [42]

4.4.2.4 Google's response

On October 16, 2018, Google filed an appeal against the Commission's decision at the General Court of European Union, stating that Android has created more choice, not less. At the same time the company announced that has been updating the agreements with device manufacturers, unbundling Google Play, Search and Chrome and allowing Android forks. The company introduced a new paid licensing agreement for devices shipped to Europe, since the pre-installation helped Google to maintain free the Android's distribution. The new licensing options are into effect from October 29, 2018. [43]

4.4.3 Google Search/AdSense (pending)

From 2016, after closing the Google Shopping case, the Commission is investigating Google's conduct regarding AdSense service. The case is still pending.

4.4.3.1 Relevant markets

In addition of the ads placed in Google's search result page, Google developed "AdSense for search" platform, which allows third-party websites to enter in an agreement with Google, that plays the part of intermediary between them and its partner advertising companies. The websites offer a search box where users can introduce queries: between the generic results are shown also ads, and when users click on them both Google and the third-party website are remunerated. A limited number of large third parties, called Google "Direct Partners", are the one that more contributes to Google's revenues and, for the Commission, Google has an anti-competitive conduct for the restriction imposed to these partners.

The **relevant markets** we can identify are the one for **general search services** (3.2.1.1) and the market of **advertisement in third-party websites** – that is what AdSense partnerships allows.

4.4.3.2 Commissions' allegations

Google has a dominant position in the market of general search services (3.2.1.2) and also in the market of advertisement in third-party websites, where the company holds a share of more than 80% in european countries, and as the Commission declares in the preliminary decision in July 2016, the company has abused of its dominant position also with AdSense.

The anti-competitive conduct identified is about **restrictions that Google applicated to its Direct Partners.** Direct Partners can't source search ads from Google's competitors and in order to make changes to competing search ads' display they have to obtain Google's concession. Moreover, there is a minimum number of Google ads to be placed into the third-party websites. The Commission is concerned that the conduct has reduced choice and innovation, distorting competition. [44]

4.4.4 Google cases analysis

Google cases raised controversial discussion: there are two very different views, one thinking that the Commission is giving too hard time to the company and that this interventionist approach is not the best in a dynamic market like the one in which Google operates; the other fearing that Google is becoming more and more a threat to competition and that EU is right in trying to intervene, but EU laws is not enough efficient to fight the threat. Both the line of thought agrees on the fact that EU competition law is not prepared to deal with online platform companies like Google, and that should be revised for the new digital economy, to save the Commission from long procedural efforts and mistakes driven by the facts that some rules don't apply in the digital sector.

It is clear without having to discuss it that at the moment in Europe Google is dominant in the search engine market. It became common to say "I will google it" and this gave a picture of how much Google is not the first, but the only choice when we have to search for something in the web, we have a doubt about something, simply when we want to look for an answer. If you try to use a different search engine you notice immediately that Google's algorithm is the best one, matches your research with the results like no one, its interface is simple and nice while other search engines present other content in their homepage (like news, pictures, mail login tools..), and when ads are present between the results they are not disturbing since they match with your research. The services Google offer besides the search engine are provided for free, easily matched together: with a Google Mail account by a quick click you can use Google Drive for keeping online your documents or sharing the same document with friends, Google Photo to store your smartphone's photos online being able to access to them whenever you want with your account (thing that you can't to with other providers, that store your smartphone content as an entire and non accessible entity), Google Maps that you probably use every day and that register your address as "Home" and makes it easier for you to see the way home by just a click. And why not doing all this with Google Chrome browser? A lot of people use all of these features, and have no intention to change provider in one of these services. The reason is simple: Google do things well, provide them for free and makes easier everything. Who wouldn't want something that works well, is free, quick and efficient? This is why Google had great success and it will continue growing. The peculiarity of Google is that even if it is primarily a search engine, it expanded in all the markets he could expand to and sort of tied all its services together, so that it is easier and nicer for consumers to have all in one package and use all the company services. Moreover, its reputation drive consumers to trust its services and, even if they have different options, to choose Google.

But, even with all these positive considerations, the fact that Google is taking everything and going everywhere is possible in the digital market keeping consumers happy have other consequences on them that they are not fully aware about and is fullfilled by anti-competitive behaviors towards the other side/sides of the market. The European Commission is aware of this and Google has become

maybe the more targeted of the tech giants. We will analyze the two main cases that the EU Commission brought on against the company, trying to understand how Google exploited its dominant position, which shortcomings the decisions have and what the Commission should reflect about when investigating in other cases.

4.4.4.1 Google Search cases

Google Shopping case went on for seven years and in the meantime Google has kept on growing and gaining market shares in different markets, by giving them advantages exploiting its dominance in the search engine market, just as it did with Google Shopping. To give an example, in Figure 4.3 you can observe the results of a research for the translation of the italian word "amico" in english, and the first thing that pops, above the other results, in a big box, and gives you the possibility to directly traduct also other words and switch the languages is Google Translate.

Image 4.3. Results given by searching for the translation of an italian word in english.[4]

In Figure 4.4 we look, this time in spanish, for ways to go from Turin to Madrid. You can see that the first results are:

- Google Flight comparative flight service, displayed in a big box with a research already done and a comparation of different airlines and their flight prices.
- Right under it, we have the route by car calculated with Google Maps.

[4] Source: google.it

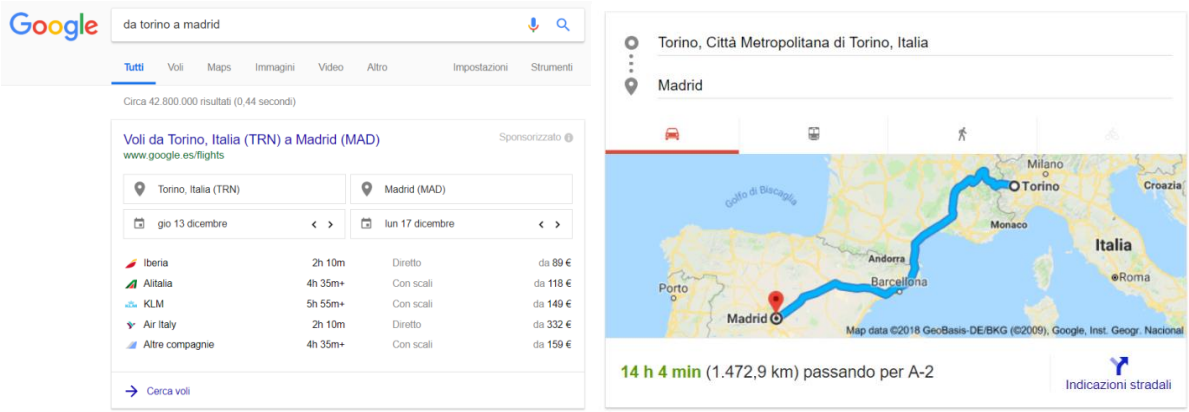

Image 4.4. Results given by searching for the route from Turin to Madrid.[5]

Only under these two big boxes results regard other comparative shopping services. This show how Google has done and is going on doing the same thing the Commission took seven years to investigate and to sanctionate for a single service, that is prioritizing its own specialized search services in general search results, with lots of other of its services. During the years of the Google Shopping investigation (2010-2017), while the Commission was deciding whether Google abused of its dominant position in the market for comparison shopping services, Google bought YouTube (2006) and by 2017 the company reached 2 billion devices in Android, 800 million of active users in Google Drive, 500 million of active users in Google Photo, over 1 billion of active users in Chrome, YouTube, Maps and Gmail. [45] This tell us that the instruments given by antitrust rules could not be efficient enough to deal with Google's rapid growth. The Commission is now investigating into AdSense from two years, and the final decision is not yet reached. Probably, other cases related to Google Search will be opened, and take other years to be brought on.

Moreover, some thinks even that the 2017 decision was useless: on November 22, 2018 the company **Foundem made public a letter**, sent to the European Commission and signed by 14 European comparison shopping websites, where the companies complained about how Google is keeping on being anti-competive and asking for the opening of a non-compliance proceeding. The companies affirm that "*Google's "compliance mechanism" in the Google Search (Comparison Shopping) case does not comply with the European Commission's June 2017 Prohibition Decision."* They argue that "*it has now been more than a year since Google introduced its auction-based "remedy", and the harm to competition, consumers and innovation caused by Google's illegal conduct has continued unabated.".* [46] Google's auction based remedy, which the companies refers to, was to integrate among the big box results not only Google Shopping but also other comparative shopping websites. But the competition problem, the companies argue, doesn't lie in the position or the visibility of the comparative shopping services: the auction-based remedy implemented by Google is not a remedy at all since the comparative shopping services listed in the auction are paying to be listed there, but "*while rivals are compelled to bid away the vast majority*

[5] Source: google.it

of their profits, Google Shopping's bids cost it nothing—its bids are just meaningless internal accounting, paid from one Google pocket into another". [46]

The companies attach to the letter a presentation, made in April 2018, where they show how during the years Google's anti-competitive practice has not changed. First, in Image 4.5, the companies show how the auction-based remedies were all rejected because judged anti-competitive. Then, in Image 4.6 they compare the last proposal with the acual implementation.

Image 4.5. Google's auction-based remedy that was rejected in 2014 because it was judged anti-competitive. [46]

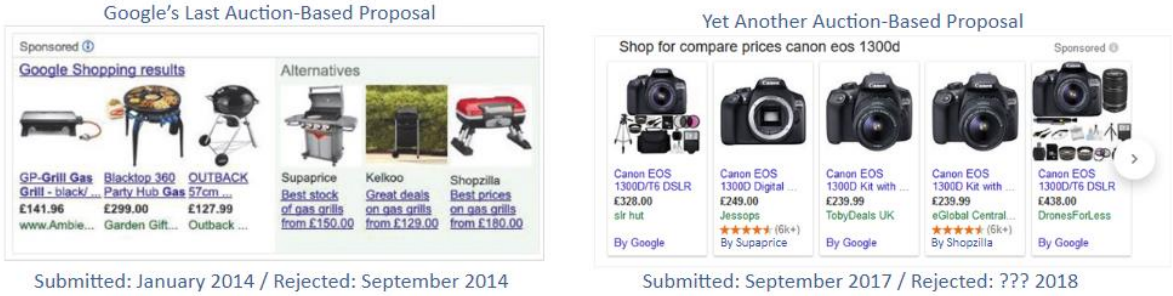

Image 4.6. Comparation between the auction-based remedy rejected in 2014 and the actual one, implemented in September 2017 by Google. [46]

The images show how Google's auction-based proposals are anti-competitive since Google profits from both its ads that for the competitors' ones. In fact, the companies say, "*as long as placement is determined by auction rather than relevance, it makes little material difference whether competitors occupy none, some, or even all of the available slots. In all cases, Google is the main beneficiary of any profits derived from these entries, and consumers are the main losers*". In fact, they also state that "*Google's new auction offers nothing of value to consumers. On the contrary, instead of relevance-based search results, which—absent Google's illegal conduct—would naturally contain an appropriate blend of merchants, CSSs, manufacturer sites and so on, users are presented with a selection of advertisements for specific products from specific merchants. These are not the best products, the best merchants, or the best prices; they are whatever specific products and merchants are likely to earn Google the most profit from a click. Not only do Google's users inevitably end up paying higher prices for products than they need to, they are often left completely unaware that comparison shopping services even exist—a problem exacerbated by Google's failure to address the anti-competitive demotion/penalty half of its illegal conduct."* [46]

The ones who thinks that Google is a threat for competition argue that more rapid and numerous investigations should be started, since the company's market share and dominance are exponentially growing and almost no pressure of competition exist in its market.

An opposite line of thought considers that the market in which Google operates is very dynamic and that, as Google says, "*competition is just one click away*". According to them, Google's dominance could be very temporary and the company could be replaced by an incumbent in the next future, just as Google did with Yahoo, and Europe is taking a too strong interventionist approach, based on the belief that government intervention is always the best way to fix things, while the right way to act to avoid preventing innovation is to let the market regulate by itself. The major part of criticism toward EU decisions and that that follow this line of thought comes from US: according to this approach, EU law is protecting competitors instead of competition. The main critic the Commission received was that Google should not be considered as dominant in the market because "*competition is just one click away*", and that switching costs are really low. This can be true if we think about Google in the search engine market. But first, even if that is true, no one "clicks away" and Google is almost the only search engine used in Europe; second, Google is more than that, and we can't say that in the other market in which the company operates, switching costs are low.

4.4.4.2 Google Android case

This case is different from the Shopping one and the still open AdSense, both related with Google's search engine market. This case is related, instead, with Google's mobile operating system market, Android, and in how the company exploited its dominant position here. Android is made available for everyone by the company, and this has the purpose, in the Commission opinion, of leveraging the manufacturers that want to use Android open source code in order to increase Google's search engine market dominance and it's ad revenues in mobile devices. In fact, even if they could choose to use the code without make an agreement with Google to have Google Play on their device, Google Play needs to be available into a device, because more of 90% of apps are downloaded through it and the devices wouldn't be competitive without Google Play.

Some criticized the decision, stating that the Commission didn't consider that also Apple has a strong presence in the market of app stores, and that used the word "licensable" in order to ignore it. It is clear enough, anyway, that the competition between the two companies in the market is not direct, since Apple uses a closed system and doesn't sell its app store to manufacturers, in fact only Apple devices have an Apple app store. A competition exists, of course, because unsatisfied consumers could change from Android to Apple, but in order to do this they should buy an iPhone (that is not really a cheap purchase) : it isn't likely that many consumers would do that.

Toma [47] analyze the Google Android case criticizing the EU Commission approach and he discusses the three allegations made by the Commission. The first allegation was of requiring manufacturers to pre-install Google Chrome and Google Search (tying practice) if they wanted Google Play, by signing a contract called Mobile Application Distribution Agreement (MADA). Tying practice, to be considered anticompetitive, has to satisfy four criteria: the tying and the tied product are separate products; the company is dominant in the tying market; consumers are harmed because they don't have the choice to obtain the tying product without the tied one, and the tying practice forecloses competition. The first criteria is easy to demonstrate, but when considering the second one, Toma raises doubts: according to him, Google is not dominant in the market for mobile OS because, even if the company has an high market share in this market, it doesn't manufacture Android devices, and market shares in this sector are unstable. He also calls into question the third and the fourth criteria: first, costumers don't lack of choice for him, since Google Search and Google Chrome can be uninstalled and replaced with alternatives in no time; second, the practice doesn't foreclose competition but have positive effects on it, because Android gives the opportunity to install apps from other sources without having to use Play Store, and it allows also to pre-install another App Store, thing that is not possible with other OS. He concluded that, in his opinion, Google has not breached the first allegation, the company indirectly created value for competitors rather than foreclose competition. It must be argued that even if it is true that consumers could uninstall Google apps for other ones, most of the time they don't. Having a search engine and a web browser already in your phone means you don't have to search for one in the store and install it: it isn't likely that they would uninstall Google Search to put Bing in their smartphone instead. The "default status", according to many researches, is often mantained and utilized, more than all in a market just born like the smartphone one was when Google started to offer Android and bundled two Google apps with Google Play. For the same reason Microsoft was accused and stopped when the company bundled Microsoft Internet Explorer and Windows Media Player with the Windows operating system on PC. Finally, if default status wasn't so important and it would be easy to uninstall Google's applications for someone else's, Google wouldn't have paid Apple 1 billion dollar in 2014 and 3 billion dollars in 2017 for setting Google Search as default status in Safari. It is evident that with this tactic, Google was able to be dominant with its search engine in mobile devices in no time, since it was the default status in Android devices and in Apple devices too (and with the two companies almost all the market of mobile devices operating systems is covered).

The third allegation is the prohibition to develop Android "forks" (exclusive dealing agreement practice), and for Toma the allegation doesn't sussist since MADA precludes the developing of forked Android versions but not of other OS. Google offer the bare Android version for everyone and gives everyone the choice of developing their own non-forked version of Android or to develop another OS; not allowing them to create a forked Android version is not to be considered an

anticompetitive behavior, since doing so would mean for the company to help its competitors. Moreover, Google controls the development costs of applications for the Android platform and this can be done only by refusing incompatible forks.

The second allegation is the only one in which Toma agrees with the Commission. Google offered financial incentives to manufacturer to pre-install Google Search, and, in applying the EU law rules, these payments exclude the possibility for competitors to have their services in a mobile phone, limiting access to users.

The Commission's decision moves towards more opportunity and choices for consumers. However, even if with this decision, it is not likely that Google's competitors will immediately start making different versions of Android, since now the consumers are used to Google's apps and services and it would be really difficult to compete with the company. If this possibility had been available in 2008, when the market of smartphone still was dynamic and competitive, it would have been different. Anyway, while Google's response to make device manufacturer companies pay for the licensing agreement sounds a little bit like a rebound, the Commission decision lead to the opportunity for development of new forked versions of Android and the increasing of competition in this sector.

4.5 Apple case: Apple's state aid in Ireland

4.5.1 Apple's tax structure in Ireland

The Apple Group is composed of Apple Inc. and all companies controlled by Apple Inc. Among the companies of the Apple Group incorporated in Ireland, some are also tax resident in Ireland (ADI, Apple Operations and Apple Sales Ireland) while some others (AOI, ASI and AOE) are not. Image 4.7 shows the corporate structure of these companies.

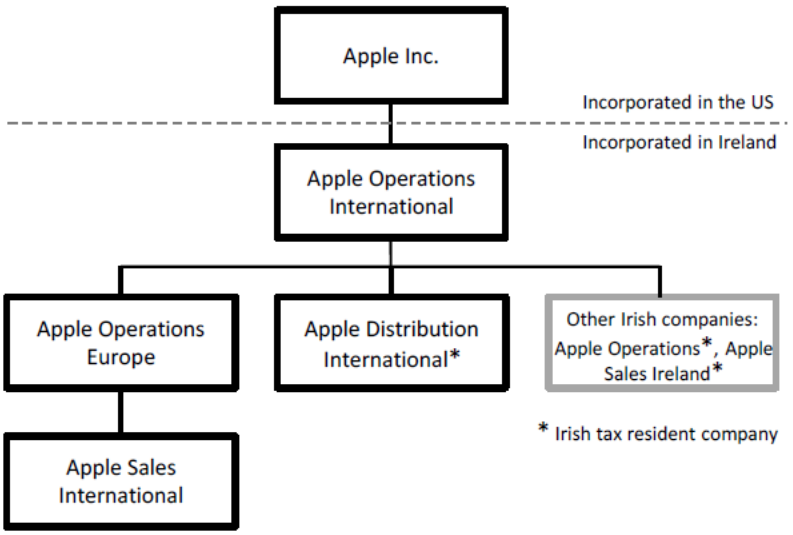

Image 4.7 Apple's corporate structure in Ireland. [47]

In Ireland it is possible for relevant companies that are incorporated in the country but centrally managed in another one to be considered as non-tax resident in Ireland. This is the case with **Apple Sales International (ASI**) and **Apple Operations Europe (AOE**): the companies don't have a taxable presence even in other countries, so that they are "stateless" regarding tax purposes.

Apple Sales International and Apple Operations Europe hold the right to use Apple's intellectual property to sell and manufacture the company's product outside US: the two companies make yearly payments to Apple Inc. for this purpose and these payments are deducted from the two companies' profits. With these payments, Apple Inc. was able to fund more or less half of the amount the company invested for research and development to spread worldwide.

The profits of the two companies that are taxable in Ireland are determined by an Irish tax ruling of 1991 that was replaced in 2007 with a similar one. According to this rulings, it is possible for ASI and AOE to internally re-allocate its profits.

Apple Sales International is responsible for buying Apple's product and sell them in all Europe, so that all sales and profits of the continent are directed to Ireland. Applying the tax ruling in Ireland, the company allocates most of its profits to its "head office", that is not based in any country and doesn't have any employees, so these profits remains untaxed. The rest of the profits – 12,5% with 1991 tax ruling and 10-15% with the 2007 one - are allocated to Irish branch and subjected to Irish taxation. For example, in 2011 ASI's profits were €16 billion, of which only 50 million were allocated to Irish branch and taxed in Ireland, the other 15,95 billion remained untaxed. The results was that ASI paid an effective tax rate of 0,05% of its annual profits. The rate decreased to 0,005% in 2014.

Apple Operations Europe is responsible for manufacturing some Apple's computers, and the same scheme of tax ruling is applied with this company.

4.5.2 European Commission allegations

The Commission contested the better tax treatment reserved to Apple Inc. by Ireland tax ruling: the tax ruling is perfectly legal if profits are re-allocated between companies in a corporate group for economic justifications. The investigation made clear for the Commission that this was not the case: the "head office" where great part of ASI and AOE's profits are allocated it's not an economic reality, the only activities assigned to it are meetings between directors with the purpose of making decisions – the same directors that were full-time working at Apple Inc. Only Irish branch had the requisite to generate income and the companies' sales profits should have been allocated only there and there taxed.

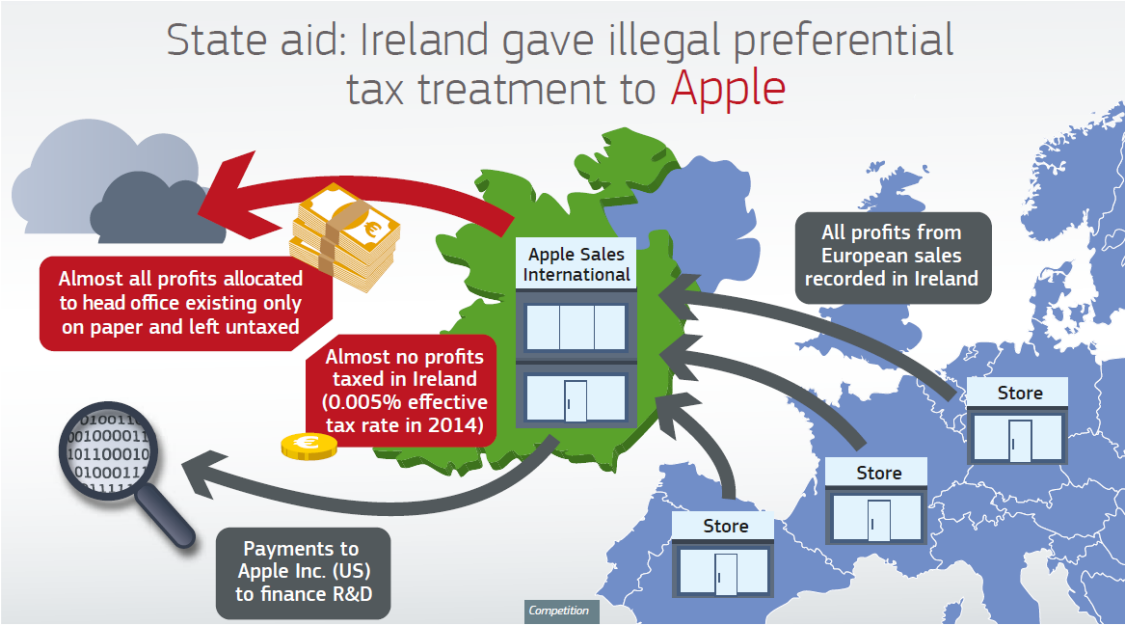

Image 4.8 Apple's tax scheme in Ireland [48]

4.5.3 Final decision

The Commission concludes, without calling into question Ireland's general tax system, that the Irish tax ruling allowed an artificial allocation of sales profits by Apple Sales International and Apple Operations Europe to "head offices" where the profits were not taxed. The Commission doesn't impose a fine on Apple Inc., but requires that the incompatible state aid is recovered in order to restore equal treatment between companies – since Apple benefited for years of less taxes. For this reason, the Commission states on August 30, 2016, that **Ireland must recover €13 million plus interest from Apple for the unpaid taxes** from 2003 to 2014. In 2015 Apple changed its structure in Ireland so that since then the tax ruling doesn't apply.

4.5.3.1 Updates

On October 4, 2017, the Commission referred Ireland to the European Court of Justice because the country failed to recover from Apple the amount of unpaid taxed stated by the Commission's decision. The deadline for the country to remedy to the illegal advantage that Apple benefited for by collecting the unpaid taxes was 4 months after the decision; more than one year after Ireland didn't recovered any of the illegal aid. [48]

4.6 Amazon cases

4.6.1 Amazon e-books

The Commission started investigating in 2015 and the case was closed in 2017. The allegation is abuse of dominant position by Amazon in the market of retail distribution in Europe of e-books in english and german languages, by requiring particular conditions in agreements with e-book suppliers.

4.6.1.1 Relevant markets

The Commission considered the **relevant markets** to be the market of **retail distribution of English language e-books for customers** and the market of **retail distribution of German language e-books for customers**. The Commission considered that there is little substitutability between e-books and printed books and that even if the language of e-books doesn't change the agreements between the e-book supplier and the e-book retailer, consumers generally don't find e-books with different languages substitutable. The relevant markets are national, so that relevant geographic markets are defined by grouping together countries that speak prevalently the same language (in Europe). This means, for e-books in English, United Kingdom and Ireland, and for the ones in German, Germany and Austria.

4.6.1.2 Abuse of dominant position

The Commission, in the Preliminary Assessment, considered that Amazon holds a dominant position in the market of retail distribution of German and English e-books. In fact, the company's market shares from 2010 to 2015 have been between 70% and 90% in the first market and from 2011 to 2015 between 40% and 60% in the second one. Moreover, there are high entry barriers in both markets and the consumers lack of buyer power.

Amazon abused of its dominant position by forcing e-books suppliers to offer to Amazon equivalent or better terms than other e-book retailers, and to notify Amazon about any changes in terms with its competitors, by contractual clauses. The clauses referred not only to price, but also to alternative business models or promotions. The Commission believes it prevented e-books suppliers from investing in potential innovative and alternative business model and it prevented Amazon's competitors from researching alternative business models to compete with the dominant company. The conduct's consequences were, in the Commission's opinion, less competition and higher prices for consumers.

4.6.1.3 Amazon's commitments

On January 13, 2017, **Amazon offered some commitments**. First, the company would not enforce any of the clauses requiring e-book suppliers to inform Amazon about competitors' new terms and offering similar conditions to Amazon. Second, the company allows publishers to terminate contract containing the Discount Pool Provision clause – a clause that gives Amazon "credits" that can be used to discount e-books of a publisher; the company obtain credits every time the price of a publisher's book exceeds the one of the cheapest e-book retailer competitor - giving 120 days' advance notice. Finally, Amazon will not apply any of the clauses in future contracts. The commitments would last 5 years and if Amazon would not respect the commitments, the Commission could charge the company 10% of its total annual turnover without having to detect an anti-competitive behavior.

The Commission accepted the commitments on May 4, 2017, concluding that the proposed commitments could solve the competition concerns that it was investigating. [49]

Image 4.9 The Commission accepts Amazon's commitments. [49]

4.6.2 Amazon's state aid in Luxembourg

The Amazon Group is composed of Amazon.com Inc. and all companies controlled by Amazon.com Inc. Among the companies of the Amazon Group two are incorporated in Luxembourg – **Amazon EU (AEU)**, the operating company, and **Amazon Europe Holding Technologies (AEHT)**, the holding company - and benefit from Luxembourg's tax treatments. Amazon EU is responsible for Amazon's retail business in Europe, as that all sales made throughout Europe are recorded in this company, and so are the profits. Amazon Europe Holding Technologies act as intermediary between Amazon EU and Amazon US; it has no employees and no business activities, but it has the right to sell Amazon's intellectual property to Amazon EU, making annual payments to Amazon in the US for this purpose.

According to Luxembourg's tax ruling, the company was able to shift profits from AEU (taxable in Luxembourg) to AEHT (not taxable in Luxembourg because of its legal form) with the justification of paying royalties in order to use Amazon's intellectual property.

4.6.2.2 European Commission allegations

The Commission considered that the profits' shift from Amazon UE to Amazon Europe Holding Technologies was not justified by the payment of Amazon's intellectual property since they were a lot higher than what AEHT paid to Amazon US to obtain it (1.5 times higher). The amount corresponded on average to 90% of AUE's profits: these profits were not taxed.

Image 4.10 Amazon's tax structure in Luxembourg. [50]

Moreover, the holding company had the only purpose of passing on Amazon's intellectual property and had no business activity that could justify the royalties' amounts. With this method, the taxed profits were a quarter less than what they should have been.

4.6.2.3 Final decision

The Commission concluded that the level of royalty payments from AEU to AEHT was inflated and didn't correspond to reality, and that Luxembourg's tax ruling made it possible for Amazon to avoid paying great part of taxes, gaining an economic advantage over competitors.

Therefore, **Luxembourg has to recover from Amazon €250 million plus interests of unpaid taxes**. The tax ruling was active from 2006 to 2014. In 2014 Amazon changed its structure in Europe so that since then the investigation doesn't apply. [50]

4.7 Apple and Amazon case analysis: Taxation in digital economy

Apple's case with Ireland (section 4.5), as the Amazon one with Luxembourg (see section 4.6.2), underline a general problem that the EU Commission is very aware of : the necessity to design a new taxation system that can apply properly to the new digital economy. The actual tax system is old and designed for brick and mortar firms, and don't fit in the modern context of big data, online transactions and intangible values, and gives the opportunity of tax avoidance within the boundaries of the law. The two Commission's decisions show that EU is aware that a solution should be found to ensure a fair taxation of firms like Apple and Amazon: the ultimate goal is to find the right way to tax "stateless" companies and they were only two examples of something that doesn't work any more and that all GAFA companies and other digital platforms take advantage of. [51]

4.7.1 Apple after 2015

To understand how sanctionating as a "punishment" is not resolving the problem, and that there is the need of a permanent solution to really make a change, we will take Apple as an example to show how the company has kept on paying less taxes than it should in Europe between 2015 and 2017, after the Commission decision.

Most of Apple's financial informations are not disclosed, thanks to its status of Unlimited Liability Company (ULC) that allows companies to not file financial reports publicly. According to Orbis [52], the world's largest business database, Apple had 241 subsidiaries in June 2018, and Orbis holds financial information about only 37 of them: more or less the 80% of Apple subsidiaries disclose no information. Apple only provides a list of its significant subsidiaries that are shown in Table 4.3, and provides no financial information about them in its annual report.

Table 4.3 Apple's significant subsidiaries. [52]

Significant subsidiaries	**Country**
Apple Sales International	Ireland
Apple Operations International	Ireland
Apple Operations Europe	Ireland
Braebum Capital, Inc.	Nevada, US
Apple Operations	Ireland
Apple Computer Trading (Shangai) Co., Ltd.	China
Apple Distribution International	Ireland

Apple, then, does not disclose profits and taxes for the individual countries and the only available data consist in:

- About the company's tax payments, a distinction is made between the provision for tax in USA and outside USA;
- About the company's operating profits, amounts are published about five segments: Americas (both North and South one), Europe (European countries, India, Middle East and Africa), Greater China, Japan and Rest of Asia Pacific;

The 90% of the tax provision is allocated to USA, even if the major part of Apple's profit are from non-US countries. Looking at Apple's annual report from 2017 [53] we can collect the results provided in Table 4.4. about the provision for income tax from foreign countries.

Table 4.4 Calculated average tax rates of Apple in non-US countries in 2015, 2016 and 2017, first method. [53]

	2017	2016	2015
Non-US pre-tax earnings (USD billion)	44,7	41,1	47,6
Non-US total tax provision for income tax (USD billion)	1,655	2,138	2,938
Average non-US tax tate (%)	3,70%	5,20%	6,17%

We can notice how, according to Apple own financial report [53], the company paid an average tax rates between 3,7% and 6,2% during the 2015-2017 period.

If we try using the data provided by the same annual report in different ways, we obtain a similar result. For instance, we used the second set of available data, the operating profits, and we detracted from them "R&D costs" and "Other corporate expenses, net" outside the Americas, obtaining a new value of pre-tax earnings. For the tax provision we use the same information of Table 4.4 since Apple doesn't disclose the tax provision for outside the Americas. The result is shown in Table 4.5.

Table 4.5 Calculated average tax rates of Apple in non-US countries in 2015, 2016 and 2017, second method. [53]

	2017	2016	2015
Pre-tax earnings calculated (USD billion)	37,1	37,3	44,7
Non-US total tax provision for income tax (USD billion)	1,655	2,138	2,938
Average non-US tax tate (%)	4,46%	5,73%	6,57%

As we said, Apple categorize as "Europe" European countries, India, Middle East and Africa, so by watching at the data the company provides we can't distinguish EU countries from the other ones. Anyway, the study conducted by GUENGL [52] estimates that: according to Indian Registrar of Companies Apple's sales in the country in 2017,2016 and 2015 are respectively 1.8, 1.5 and 1 billion USD; the numbers for Africa and Middle East are small since Apple held a market share between 3 and 5% during 2015-2017 here; in Russia Apple's net sales were 2 billion USD in 2016 and 1.5 billion USD in 2015; no information is given about other non-EU countries so taking this into account more or less 90% of the Europe's segment sales comes from EU countries.

The rate taxes were calculated basing on tax provisions, and it is likely that the actual transferred amount was even lower. In Apple Cash Flow Statement [53] the company doesn't disclose the actual amount we refer to, but it discloses the information "Cash paid for income taxes, net". We compared this value with the one of the total provision for taxes in Table 4.6.

Table 4.6. Comparison between provision for income taxes and cash paid for income taxes in 2015-2017. [53]

	2017	**2016**	**2015**	**Average**
Cash paid for income taxes, net	11,591	10,444	13,252	11,762
Provision for income taxes	15,738	15,685	19,121	16,848
Ratio	73,6%	66,6%	69,3%	69,8%

We can see how the amount actually paid for taxes is lower than the provisions, in average it correspond almost to 70% of the provisions. This lead to think that the actual tax rate paid by Apple in EU countries is even lower that the ones we calculated in Table 4.4 and Table 4.5.

According to these results, after the Commission decision and Apple's corporate restructuring in Europe, the situation is still preoccupying.

4.7.2 General overview

Image 4.7 shows how in 2017 the effective average tax rates were much lower for digital platform companies (like Apple, as we analyzed in section 4.7.1) than for firms with traditional businesses and gives an idea of the range of the problem.

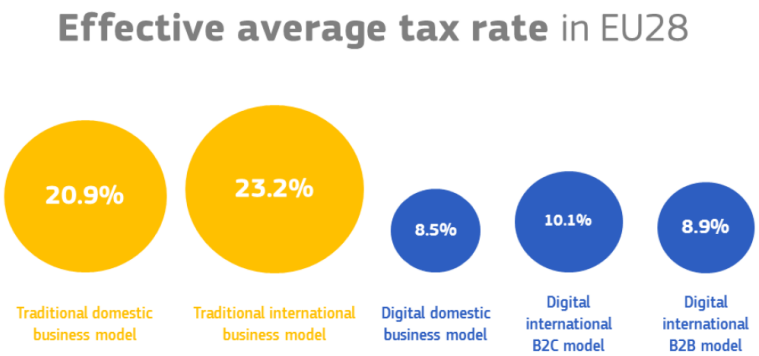

Image 4.11 Effective average tax rates of traditional business VS digital ones in 2017.[6] [51]

6

The problem is to find a way to tax firms when even if they operate in a country, their main activities are declared to be outside of the country. In fact, in the actual tax system, Specific taxes for online platforms ("Google taxes") were proposed in Italy, France and Great Britain: in the firsts it didn't go further, in UK the diverted profit tax was implemented with this purpose, but it wasn't successful. The problems are the following:

- Online platforms don't need a constant physical presence in the country ("permanent establishment") to sell good and services there: this lead to the problem of **where to tax**.
- Online platforms have different business models derived from exploitation of data and intangible assets and it is difficult to give value to their assets: this lead to the problem of **what to tax**.

The permanent establishment rules should be replaced, for the digital sector, with other indicators for significant economic presence, to make the firm taxable in a country and solve the first problem. The second problem requires alternative systems to allocate profits in countries: the transfer pricing rules can't be used with digital platforms because the result would be tax avoidance and inefficiency (as happened with the two cases studied). [51]

These challenges are not easy to overcome, and the Commission knows that a common decision that includes all European countries should be taken, in order to find a solution and a tax system able to allocate and capture the value created by digital firms. This will take time and, for the moment, some short-term solutions are being implemented. We will discuss the short-time solutions recently implemented by EU Commission and which could be some long-time solutions in the next chapter.

4.8 Facebook case: the merger with Whatsapp

The investigation started in August 2014 and the final decision was taken by October of the same year. The purpose is to analyze the acquisition of WhatsApp by Facebook for 19 billion dollar. Anyway, the case was opened again by the EU Commission since Facebook didn't comply with the terms.

4.8.1 Relevant markets

The **relevant markets** defined by the Commission and in which the Commission investigated the consequences of a merging between the two companies are the market for **consumer communication apps for smartphones**, the market for **social network services** and the market for **online advertising services.** The Commission considered that the relevant geographic market is at list European-wide, if not world-wide for the first two and national for the last one.

Digital business model is the average over three different models ('domestic', 'B2C', 'B2B'). The B2C and B2B models use subsidiaries to organize their sales and marketing activities.

Consumer communication services are multimedia solutions that allows to communicate with other people. These services are offered by a single app (WhatsApp, Skype) or by a feature that is integrated in a bigger platform like a social network (Facebook Messenger) and allows real-time conversations between two users or a group of users, with the availability of different options like messaging, video chat, voice call, sharing of multimedia and location, etc., even if not all these functionality are available in all consumer communication apps.

Social network services is the core service offered by Facebook, it is a recent phenomenon still in its early stages of evolution; these services enable users to connect, interact in different ways and express themselves in an online platform or in a mobile app. The essential functionalities of a social network service include creation of a profile and a list of contact, it can include also a messaging feature, the possibility of sharing information and commenting posts. There is an overlap between the market for consumer communication services and the market for social network services since they both enable users to share content; anyway, social network services offer a richer experience and reach a wider audience than consumer communication apps, that are more personal.

Online advertising services are provided by Facebook social network platform: Facebook collect users' data in order to target them and offer personalized ads on behalf of advertisers. On the other hand, WhatsApp doesn't sell advertisement nor collect data about users since messages are not stored in WhatsApp servers.

4.8.2 Commission investigation

The Commission investigated the possible consequences of the transaction on competition in the three relevant markets. Facebook and WhatsApp are both active in the market for consumer communication services, while only Facebook is active in the other two relevant markets.

Even if consumer communication apps are characterized by strong network effects, the Commission considered that there is also high possibility to multi-home, switching costs and barriers to entry in this market are low so the network effects are mitigated. The market of consumer communication apps is a recent and fast-growing sector, still dynamic; for this reason the Commission think that high market shares don't imply necessarily market power. For these reason, the transaction doesn't pose competition problems in this market. Moreover, Facebook and WhatsApp are not considered close competitors in this market by the Commission since the two are utilized as complementary products by the consumers, they have a different privacy policy and they offer a different experience to users.

Regarding the market of social network services, the Commission concluded that there is no competition between the two companies in this market and the potential integration of Whatsapp and Facebook is not in the company's plans and would not be a threat to competition anyway.

In the market of online advertising the Commission analyzed two possible outcomes that could harm competition: the introduction of advertising on WhatsApp by Facebook and the use of WhatsApp's data to improve the targeting of Facebook's ads. Facebook declared that it wasn't its intention to apply one of the two scenarios and the Commission concludes that both scenarios would not raise competition issues since a great number of alternatives would keep on being available for users.

4.8.3 Final decision and 2017 fine

The Commission decided, on October 3, 2014, **not to oppose to the transaction and declared it compatible with the vigent competition rules**.

In August 2016, WhatsApp updated its privacy policy and term of service, introducing, along with some new features like WhatsApp Web, the possibility to match Facebook account with the WhatsApp one through the phone number. The Commission opened an investigation in December 2016, addressing to the company the allegation of providing misleading informations during the 2014 investigation, since Facebook always declared it had no intention at all of connecting users' profile of the two platforms. This doesn't change the 2014 decision since the Commission considered the possibility that this could happen and concluded that it would not have been a treat for competition, but the Commission decided on May 18, 2017 that Facebook is **fined for €110 million** for giving misleading information. [54]

4.8.4 Case analysis

The case describes the biggest merger of the last years, which approval was highly debated and criticized. The decision definitely taken by the Commission was to approve the merger, substantially because the two companies were not considered direct competitors but rather complementaries for users and that the market power of the merging company didn't raise competition concerns.

Ocello [54] analyzes the decision in order to understand which lessons should be learnt from that. At the time of the decision, Facebook had 1.3 billion users worldwide, with 250-350 million of them users also in Facebook messenger app, while WhatsApp had 500 million users. The transaction was highly debated because of the important parties and because Facebook was about to pay 19 billion dollars fot a company with a turnover of only around ten million euros. Because of this, the merger didn't meet the turnover thresolds required by the EU Merger Regulation. The Commission find it necessary to investigate the transaction anyway, because of the size of the two companies.

The two companies were of course complementary to users, as the Commission declared. In fact, WhatsApp offers little features about profile personalization (just a photo and a static status; most recently, after the merger, you can also share histories) and a private communication service that you can access only knowing the phone number of the person you want to communicate with, while Facebook has the wider purpose to allow users to connect with everyone that has a profile, just searching them by their name and adding them to the friends' list, and offer to users wide opportunities to personalize its own profile, creating photo albums, sharing posts, videos and other media with all the network. It is also true that WhatsApp's size, if measured by its turnovers, wasn't as high as to raise concerns about the market power deriving from the merger. However, the fact that they offered different services to users doesn't mean that they were not in competition at all between each other: when people communicate through WhatsApp, they are not spending time on Facebook or chatting via Facebook Messenger, so in some ways WhatsApp was stealing audience from Facebook. Even if WhatsApp had little turnovers, both the companies could exploit strong network effects, so the combination of the two multiplicates the network effects and

gives a great market power to the merging company, a power measured not by the companies' turnover but by their ability to exponentially grow thanks to network effects and develop economies of scale, and mostly by the amount of data the merger unit owns, that gives great value to it. Moreover, online platform markets are dynamic and even if in the present situation, when the Commission made the decision, Facebook and WhatsApp were not direct competitors, in the future they could have been. WhatsApp could have grown, diversified and expanded in new market, becoming a direct competitor of tech giant platforms: Google and Facebook are direct competitors in the online advertising market even if at the beginning they were respectively only a search engine and a social network. By approving the merger, the Commission could have allowed Facebook to eliminate a potential future threat when it was still small.

Another concern that can be identified has something to do with privacy and data protection. Facebook is the biggest social network of the world, with billion of users, and the company knows so many things about its users thanks to the data collected with them, that it would be able to rebuild its personalities, passions, potential behaviours better than these users' friends. In addition to this, the Commission allowed to the company the acquisition of WhatsApp, a messaging system that billions of people use every day and that has practically replaced the SMS system. This is not a competition problem, as the Commission underlined when taking its decision: concern about data and privacy were raised during the investigation but they didn't fall in the scope of EU competition law rules, rather in the one of EU data protection rules. Anyway, the Commission considered two possible outcomes of Facebook using personal data from WhatsApp that could harm competition (introduction of ads on WhatsApp and using WhatsApp data to improve targeting of Facebook ads), but judged them unlikely to materialise. However, with the introduction of the new GDPR (see section 4.2.3) we hope that the introduction of data portability will mitigate the competition problems caused by data collection.

4.9 Other relevant digital platforms cases

4.9.1 Booking.com case and price parity clauses

The case was opened in 2013 and closed in 2015 by French, Italian and Swedish competition authorities.

Booking.com is an online platform where consumers can search, compare and book hotel rooms free of charge. Hotels pay a commission to Booking.com every time a booking is made. Booking.com is one of the Online Travel Agencies (OTAs) that were accused of anti-competitive behavior because of their use of the so-called **price parity clauses**: these clauses could be wide price parity clauses, requiring hotels to offer an equal or better room price in Booking.com than in other online and offline channels, including its own website, or narrow price parity clauses, that required hotels to offer the same or a better deal than its own website, but didn't prevent them to offer a better deal on other platforms. This meant that hotels couldn't offer better deal directly to consumers even if, when selling directly, they didn't have to pay a commission, and that if Booking.com decided to raise its commission rate, they couldn't raise the prices on the platform anyway. The consequence is that parity pricing clauses could restrict competition between OTAs, preventing new entrants to join the market and offer lower price rates by guaranteeing lower commission rates to hotels. Booking.com argued that the parity pricing clauses had the purpose of

avoiding free-ride: in fact, it would have been easy for a consumer to find an hotel on Booking.com platform and then check on the hotel's website if the price offered was lower.

Finally, Booking.com offered its commitments: wide parity pricing clauses would be eliminated from the contracts, and the platform could not prevent hotels from offer discounted room prices via offline channels or to members of a loyalty scheme. The commitments were accepted by the three competition authorities and the Booking.com case was closed in France, Italy and Sweden. [56]

The case against Booking.com was also opened in Germany, but the decision was different: on 23 December 2015 the German national competition authority prohibited any use of MFN clauses to the platform, the narrow ones included.

4.9.2 Consumer electronic companies and vertical price fixing

In May 2015, the Commission opened a competition sector inquiry on e-commerce to identify possible competition concerns on this market. After the inquiry, in February 2017 the Commission opened three separated investigations into suspected anti-competitive practices that violate Article 101 TFEU in the e-commerce market. One of these investigation concerns consumer electronic market, in particular four manufacturer companies: Asus, Denon & Marantz, Philips and Pioneer.

The allegation is of restricting the ability of their online retailers to set their own prices for consumer electronic products like notebooks, kitchen appliances, and so on. They prevented retailers from setting prices lower than the one imposed by them and the result was that the average price of all consumer electronic products was higher, since lots of retailers use tools to adapt their prices to the one of other retailers. Moreover, the companies used software in order to monitor retailers' prices and to intervene if they get lower. The total effect was, then, less competition between retailers and overall higher prices in the consumer electronic market.

The anti-competitive conduct was brought on by Asus with computer hardware and electronic products between 2011 and 2014 in France and Germany; by Denon & Marantz with audio and video consumer products between 2011 and 2015 in Germany and Netherlands; by Philips with a large range of consumer electronic product between 2011 and 2013 in France; by Pioneer with speakers and hi-fi products in 12 different European countries between 2011 and 2013. The decision was reached on 24 July 2018: the Commission fined the four companies for a total amount of €111 million. The four companies collaborated with the Commission during the investigation and admit the violation of EU antitrust rules, so the total amount was reduced for collaboration, as we can see in Table 4.3. [57,58,59,60]

Table 4.7 Reduction for collaboration and fine amounts for the four manufacturer consumer electronic companies that violated antitrust rules. [57,58,59,60]

Company	**Reduction for collaboration**	**Fine (€)**
Asus	40%	63,552,000
Denon & Marantz	40%	7,719,000

Philips	40%	29,828,000
Pioneer	50%	10,173,000

4.9.3 Cases analysis: Most Favorite Nation clauses

The so-called Most Favorite Nation clause (MFN) is another name to call the price parity clause we discussed in section 4.9.1, often used in contracts between an online platform and its suppliers. As we said, it implicates that the latter can't charge a lower price for its products on its website (narrow MFN clause) and in some cases also on another platform (in wide MFN clauses).

MFN clauses have anticompetitive effect because they can cause barriers to entry: if a new platform wants to enter in the market by accepting a lower fee from suppliers in order to offer lower prices to consumers, suppliers can't take the deal because of the MFN clause; this is an harm to competition because prevent new entries in the market and also to consumers, that can't benefit from an eventual lower price. MFN clauses could be seen also as fixed vertical price clauses (see section 4.9.2 as a case example), that occurs when there is a sort of collusion between suppliers to set the same prices on retailers' platforms or websites. It is also true that MFN clauses prevent suppliers from using the free riding strategy: they could use the platform to get known by the consumers and offer a lower price in their website to drive them into buying the product or the service directly from them, without having to pay a fee to the platform. This is why most of the nations that investigated on Booking.com decided to leave the possibility to the platform of using narrow MFN clauses.

Talking about this, the different decisions underline a problem of uniformity: it is not easy for a platform like Booking.com having to apply different policies and structure depending on the EU country, EU should take a common decision on these matters.

Also Amazon e-books case (see section 4.6.1) involved MFN clauses, in this case the authority involved was EU Commission. The peculiarity was that the Commission didn't use Article 101 TFEU to justify its conclusion, but Article 102 TFEU. This is because of the online platforms' business model: in fact, according to Article 101 TFEU, agreements between undertakings are forbidden, but in the Amazon and Booking.com case we have an agreement between a platform and its supplier, where the price of the final product that the consumer will pay is set by the supplier, and the latter pays a fee to the platform for using it as a place to sell the products. The model described is an agency model, that does not fall inside Article 101, since the online platform is merely an intermediate; suppliers are taking all the risks and setting the prices so it is not correct to define as an agreement between undertakings the one the online platform has with its suppliers. [59]

This is way the Commission used Article 102 TFEU that was more appropriate; but, in order to use it, the Commission had to define the relevant market in which the company was dominant, prove its dominance in this market and prove that Amazon was abusing of it. This procedure took time and resources; in my opinion, it could have been easier to apply Article 101 TFEU, but it is not designed for cases like this that involves particular business model. The Article is directed more to avoid anticompetitive conducts like the one of section 4.9.2, where the supplier is guilty of the anticompetitive conduct rather than the online platform. The investigations took just a little more than a year to reach a decision and be closed. If, in this case, the online retailers would have been

the ones to force retailers to set the same prices in every platform, the Commission couldn't have used Article 101 TFEU to come with a decision. [61]

5. GAFA's new weapons for competitive dominance

European Commission have begun to act against digital platform monopolies and to recognize the anticompetitive consequences of their business model. On the other hand, in US the view is different and these companies are avoiding scrutiny because they don't use their market power to raise prices and then, according to this view, there is no economic evidence of a consumers' harm, multi-homing is possible and barriers to entry are low. This last view presents some flaws, since *"as several commentators have observed, the practical barriers to successful and sustained entry as an online platform are very high, given the huge first-mover advantages stemming from data collection and network effects*". [21]

In this chapter we will explore the new "weapons" that GAFA companies use to maintain and raise their dominance and the effects of these practices on consumers. The most significant potential competition weapons can be identified in collection of data and leveraging strategies. At the end of the chapter we study how GAFA companies are using these practices to maintain their dominance with two case studies as example.

5.1 Collection of data

Huge and ever-growing datasets owned by GAFA companies raise some concerns and it is the most important "weapon" they can use to maintain their dominance, through different strategies. Data collection raise, first of all, concerns about **users' privacy** and how much they know about what these companies do with their data. With data, online platforms are able to actuate **personalized pricing** and **nowcasting** to prevent new entries in their markets. Finally, network effects and the concentration of Big Data in just few firms lead to monopolies and there are some **security risks**.

5.1.1 Privacy issues

Traditionally, price has been the parameter to look at when it comes to competition issues. This view should change in dealing with digital platforms. An important non-price parameter to be considered in the digital world is degraded quality. Even if, thanks to network effects, quality increases in many levels on online platforms, there are others where it can deteriorate, like in privacy protection. In fact, in order to exploit users' data at the most, online platforms can lower their privacy protection: users' data is the currency users pay for the "free" services they are offered. This data can be worth more than the cost online platforms incur in order to provide the free services. [62] Some European Commission officials underline how if a platform, after a merger, "would start requiring more personal data from users or supplying such data to third parties as a condition for delivering its 'free' product" then this *"could be seen as either increasing its price or as degrading the quality of its product."*. [55] Privacy is also very difficult for users to perceive and verify: for a platform privacy protection results in limitation of data utilization and, consequently, less economic profits. For this reason, lowering the privacy protection level brings more profits to online platforms. We discussed the merger case between Facebook and WhatsApp (section 4.8) and this can give us a great example: the change of WhatsApp privacy terms that lead the Commission to sanction Facebook demonstrate how the real value Facebook was interested in WhatsApp's acquisition wasn't money – indeed, the company removed the little annual fee of 0,99€ that consumers of some countries paid for the app – but data instead. What the merging company did was not raising the price of the acquired service in order to gain profits, but rather lowering its quality (by changing the privacy policy). Consequently, consumers who valued their privacy more than the fee requested by WhatsApp, after the merger found themselves with a free service but with lower privacy and their welfare decreased. According to this, traditional instruments like SSNIP test are not useful in digital economy, but it would rather be more useful to use a new tool like SSNDPP (small but significant non-transitory decrease in privacy protection).
Users are actually working for free for online platforms when they provide content, posting videos on YouTube or comments on Facebook: it is not likely that these platforms would be so widespread if other competitors started to pay users for their content; this would lead to competition between platforms like social networks to get users' data. However, thanks to network effects this doesn't happen and the biggest online GAFA platforms own more and more datasets that give them increasing competitive advantages. German competition authority, Bundeskartellamt, has become very aware of this issue, and it is interesting to analyze its assessments in the investigation that it

opened against Facebook. In its preliminary assessments the Bundeskartellamt states that the company *"is abusing this dominant position by making the use of its social network conditional on its being allowed to limitlessly amass every kind of data generated by using third-party websites and merge it with the user's Facebook account*". [63] Consequently, the German Commission identifies the excessive collection of consumers' data as a form of abuse, as could have been an excessive price charged on consumers. Moreover, it becomes evident that consumers are not aware of how digital platforms collect this data and what they do with it. Andreas Mundt, the president of Bundeskartellamt, affirms: "*We are mostly concerned about the collection of data outside Facebook's social network and the merging of this data into a user's Facebook account. Via APIs, data are transmitted to Facebook and are collected and processed by Facebook even when a Facebook user visits other websites. This even happens when, for example, a user does not press a "like button" but has called up a site into which such a button is embedded. Users are unaware of this. And from the current state of affairs we are not convinced that users have given their effective consent to Facebook's data tracking and the merging of data into their Facebook account. The extent and form of data collection violate mandatory European data protection principles*." [63] The German Commission, then, investigated Facebook's users' data collection even when they visit a third-party website: for example, if an users visits a newspaper website and reads an article and in this website Facebook's like button is present, the company is able to collect his personal data. Users are most of the time unaware of the amount of their personal data online platforms owns, because privacy policies are vague and because, even when they're clear, the alternative option would be not to participate in the platform at all. This "take it or leave it" deal, for online platforms that have strong network effects and whose dominance is consolidated like Facebook, can't be refused by users. In the Facebook example, to do this, they should give up the possibility to enter in the biggest social network in the world where they can reach their friends and relatives.

The problem is getting bigger and bigger : GAFA companies are developing new products and expanding into new markets that will provide them with so much data on us that they will know more things about us than our own friends. One example is the new smart, learning device assistants that the companies produced and that nowadays compete aggressively with each other: Amazon's Alexa, Google's Google Home and Apple's Siri. Users are buying them and taking them inside their house, talking to them and revealing personal and important data about themselves for free, increasing GAFA's competitive advantage and market power.

5.1.2 Personalized pricing

Online platforms can use the personal data they own about users to understand the willingness to pay of each one of them. With this information, they can actuate a unique price discrimination based on the individual and help their suppliers (advertisers, developers, sellers ...) discriminate, giving them an information advantage incomparable with anything. In this way, they can target very well consumers, and charge them the highest price they are willing to pay: they can "profile" individuals offering them content that they know could appeal to their personal interests. Online platforms are able to do this with the personal data they own, that is a combination between the different areas of interaction that a platform operates: for example, when you search for something on Google Search, the search engine doesn't only rely on itself, but to give you better results it uses the data it owns from other sources, like the content of emails (Gmail), the phone you're using (Android), your browsing history (Chrome) and your current position (Maps). That is why the data that a platform owns doesn't only consist in the data users provide voluntarily, but there are also other two categories of data, the data they can observe while users are navigating online, and a most

sensitive category of data, that they can infer studying patterns and correlations. Most users don't know the existence of inferred data, that is indeed the one that allows platform to personalize prices: in fact, before digitalization occurred, firms could only rely on volunteered data. In Table 5.1 we can observe the categories of personal data collected online, defined by OECD.

Table 5.1 Categories of personal data collected online. [64]

Volunteered data	Observed data	Inferred data
Name	IP Address	Income
Phone number	Operating system	Health status
Email address	Past purchases	Risk Profile
Date of birth	Websites visited	Responsiveness to ads
Address for delivery	Speed of click through	Consumer loyalty
Responses to survey	User's location	Political ideology
Professional occupation	Search history	Behavioral bias
Level of education	"Likes" on Social Networks	Hobbies

With inferred data, platforms can determine the willingness to pay of every consumer and charge them differently. According to OECD's studies, the price set is lower than the individual willingness to pay detected, since the estimations could overestimate it and they have to consider prices imposed by competitors. An experiment conducted under different simulated competing conditions in an UK University found out that "*when allowed personalized pricing, the subjects set prices as a fixed share (and not the full value) of consumers' willingness to pay. A curious finding was that the fraction charged was around 64% of the willingness to pay across all experiments, not varying with the number of sellers competing against each other .*" [64]

Uber, a ride-sharing US company, has been accused of using the personalized pricing practice by users: sometimes the platform charges different prices for rides with the same route at the same moment. It is not clear how Uber use personal data to set prices, but some consumers noticed different prices charged when they switched the credit card from the personal one to the company's one. A behavioral scientist working for Uber admitted, in 2016, that the company knows that users' willingness to pay raises if their phone's battery is low, even if he stated that they don't use that information. The mere fact that the company has in its staff behavioral scientist pose some doubts about their pricing practices. [65]

With this information, it is not difficult for the platform to implement personalized pricing, for example, knowing that a consumer is using an Apple device to navigate can be considered as a proof of higher income and he can be charged higher prices. The practice well analyzed by OECD: it is a particular form price discrimination, considered as "perfect" or "first degree" price discrimination, defined as "*any practice of price discriminating final consumers based on their personal characteristics and conduct, resulting in prices being set as an increasing function of consumers' willingness to pay*" [64] In Image 5.1 we can observe the difference between uniform pricing, where all the consumers pay the same price for a product, and personalized pricing.

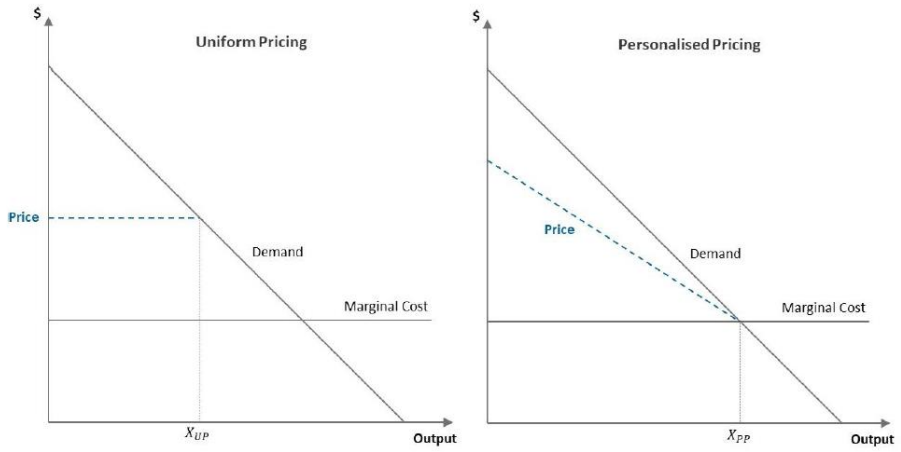

Image 5.1. Uniform pricing vs personalized pricing. [64]

The impact of personalized pricing on social welfare is positive, since the practice can maximize it because it reaches every consumer. We can see this effect looking at Image 5.2. The blue area is bigger with personalized pricing.

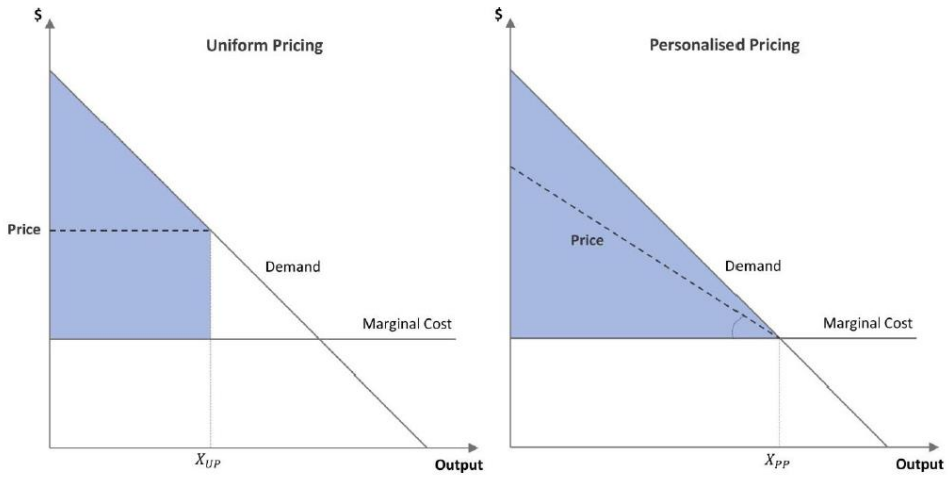

Image 5.2. Social welfare increases with personalized pricing. [64]

Even if the total welfare increases, and this seems to be positive, must be analyzed the way the extra surplus is distributed. In fact, on one hand surplus is transferred from consumers with higher willingness to pay (that are charged more) to the ones with lower willingness to pay. On the other hand, the practice also affects the distribution of surplus between consumer and producer, and this is what pose competition concerns. Actually, the outcome of personalized pricing depends on the degree of application of the practice: with a perfect price discrimination (that as we discussed before, it is not likely to be applied) all the surplus would go to the producer, leaving consumer surplus equal to zero; on the contrary, if the degree of personalization is low and the pricing line is close to the marginal costs' one, almost all the surplus would go to the consumers. We can observe this looking at Image 5.3: like before, we have a representation of both the cases of uniform pricing and personalized pricing. The blue area indicates the consumer surplus while the grey one the

producer surplus. By rotating the dashed line of the price in personalized pricing, the distribution of the surplus changes: an upward rotation would increase producer surplus, while a downward rotation would increase consumer surplus.

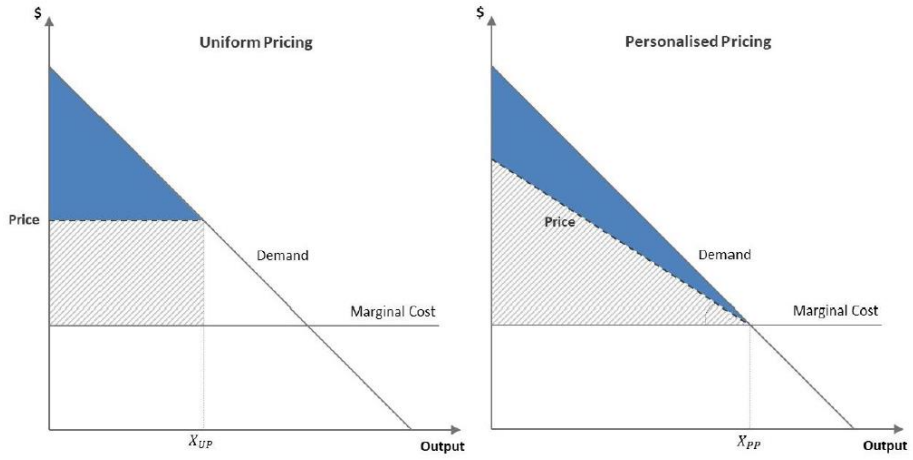

Image 5.3. Impact of personalized pricing on consumer surplus and producer surplus. [64]

It is not very clear then, what could be the effect of personalized pricing, but we can affirm that a very strong use of this practice can harm consumers. In a competitive market, where a firm can't discriminate prices too much because it has to consider prices offered by competitors, the practice is not likely to be harmful; on the contrary, in a very concentrated market where little price competition is observed, it would be very easy for the monopolistic firm to push this strategy to levels that cause harm to consumers. We can conclude that the risk that personalized pricing would be a harmful practice is higher where firms have great market power, and the utilization of this practice by dominant digital platforms could pose high competition problems. Companies often hide the use of this practice offering personalized offers like discounts or promotions. Moreover, it is preoccupying that only a little part of consumers know how their data is used to profiling and personalizing, most of them are not aware of the issue and even the ones that are aware of it are not provided with the instruments to overcome the problem. Information about how data is collected and utilized are hidden behind long pages of privacy policy with ambiguous meanings: generally, very few consumers read the privacy policy terms; the ones who read it, often don't understand it and even if they do, the choice is a "take it or leave it" offer, as we explained, so they either accept it or they don't participate at all.

Digital platforms can also use data to price discriminate upstream: for example, Amazon pays authors that use its platform to publish and promote their work by the number of pages of the digital book that people actually read on Kindle, not anymore on a per copies downloaded basis. This can lead to less incentives and some authors could forego producing books.

5.1.3 Nowcasting

Past monopolies that didn't collect data didn't have the competitive advantage that online platforms have; they can access and analyze data to discern threats and study what competitors are doing and what the consumer wants. They can "nowcast", that means that they can predict the present and be

aware of the trends: social network posts and likes, search queries, emails, visited websites, and so on serve to this. The consequence is that dominant digital platforms can identify potential threats in a small amount of time and do something to turn them off before they can become a competitive threat. For example, they can acquire these companies: Facebook used the data security app not really much known Onavo in order to monitor users' smartphone activity, and this feature was what determined the company's decisions of acquiring Instagram, WhatsApp and recently (2017) tbh, a social pooling app. Nowcasting also made Facebook very aware of the threat posed by Snapchat, that was becoming very popular with its features: with this social networking app you could share "histories", thus pictures or media that lasted only one day, or send them to friends and make them last even only some seconds. Facebook quickly reacted to the threat and copied histories, implementing them on Instagram (where they were more successful), Facebook and WhatsApp. Soon the majority of people stopped using Snapchat and now Instagram is becoming increasingly successful thanks to the implementation of the histories feature. This was possible because GAFA companies are able to track users' activities and interests in other platforms. The consequence is that innovative and potential competitive start-ups are likely to be acquired to integrate their innovation in the acquiring company or to be "copied" to offer the same innovation to users in a consolidated, dominant platform, that thanks to network effects prevent consumers to switch to the new company that had the idea in the first place, even if it offers an higher quality level. [62]

5.1.4 Winner-takes-all outcome

Owning big data sets combined with network effects, both characteristics of online platforms, lead to winner-takes-all outcomes. In fact, the first platform that is able to create audience and to collect data, thanks to the analysis of such data and the interactions it can exploit, becomes inevitably more efficient than competitors. Autoritat Catalana de la competencia uses Google as the emblematic example of this problem: "*Once Google designed its information ranking algorithm and obtained a large number of users, the same algorithm was refined (learning) from each of the interactions. This, in practice, may mean that even if a powerful competitor such as Microsoft dedicates great effort to creating an alternative search engine (Bing), and even if its design is better than Google, it will be unlikely to perform as well as Google's as it does not have a sufficient number of interactions to learn from them*." [67] The fact that the structure of these markets it is likely to lead to monopolies is a competition problem. The Commission is well aware of this problem and the recently introduced data protection policy GDPR (see section 4.2.4) is a step towards a resolution. In fact, the introduction of data portability, in the previous example, could allow users to decide to give the search history they made on Google Search to Bing, and, with this information, the latter could develop an improving competitive algorithm.

5.1.5 Security risks

Owning such a great quantity of data involve risks. The concentration of data in few firms make it more likely that they could make arrangements with some governments, that would agree to give them something they want in exchange for data. If there were more firms in a competitive environment, it would be more difficult for a government that want to access data to bribe lots of companies. Moreover, even if the monopolist digital platforms would not agree to release their data, with concentration of data in fewer companies, the risk of a security breach is higher since there is more incentive to try a privacy violation, and if it was successful it would have enormous consequences. We talked about the scandal of Cambridge Analytica, that had serious political consequences, in a way that we still don't understand entirely, and that breach involved only a little

part of personal data that Facebook owned. If more than just a part of data was breached, the consequences could be enormous. For example, a major leak into every Google Gmail's existent account could allow to discover every user's bank account password thanks to the "forgot password" functionality and could lead to an incomparable crisis. [62]

5.2 Leveraging strategies

Online platforms can abuse of their power through different strategies. With these strategies, they leverage their market power in order to obtain something. At first, they have a strong **bargaining power over suppliers/developers** that they can exploit, harming directly them but indirectly also consumers. Their power lead also to **political and social influence** and they can use their dominant position in one market to strengthen their position in another one. Finally, another leveraging strategy is imposing **exclusive agreements** or eliminating rivals by **exclusionary conducts**.

5.2.1 Exploiting bargaining power

Due to their multi-sided nature and the presence of network effects, online platforms own a very high bargaining power over their suppliers or their charged side of the market. The presence of indirect network effects means that the platform's suppliers have no alternative since all the customers they're looking for are users in that platform and either they accept the conditions offered by the company or they leave. These "take it or leave it" deals are highly implemented by GAFA. Amazon uses its bargaining power in order to collect higher fee from its suppliers. For example, the company has had some disputes with book publishers: the ones that didn't agree with the new terms were taken out of the platform, and since Amazon represented a great value for them they had to accept eventually. Google was investigated by the FTC for unfairly scraping (stealing content) from competitors' websites and pass it on its website like if it was its own. Moreover, the company used its dominance to threaten them, stating it would delete them from the search engine's search results. The investigation was closed in 2013 after a Google's statement where the company promised to stop scraping. Amazon also exploit its bargaining power with the private label business (see section 5.4) and with the delivery business. Khan [21] discusses the last one, explaining how Amazon gradually became independent from delivery companies and succeeded in becoming a delivery company itself. The company did this by using its bargaining power in order to obtain, thanks to its scale, lower fees from big delivery companies like UPS and FedEx, offering at the same time a delivery service to independent sellers (Fulfilled by Amazon) with lower fees. Since the major delivery companies had to make up for discounts given to Amazon, they raised the prices for other sellers and this made the Amazon offer even more desirable: going through Amazon was cheaper so Bezos' company succeeded in building, over time, a very strong delivery business.

The result of this behavior is bad also for consumers, because the higher fee imposed, in Amazon's case, to book publishers results in higher prices for books, or the higher fee charged to advertising companies by Google results in higher price for advertised goods: consumers would pay less if there was more competition because suppliers would be charged less.

5.2.2 Lobbying and public influence

GAFA companies can appeal to lobbying in order to maintain their dominant position. As the Time states, in 2017 Google "spent over $18 million lobbying politicians" and "this is the first time a technology company has spent the most on lobbying costs in at least two decades. Facebook spent $11.5 million on lobbying activities in 2017, Amazon spent over $12.8 million, and Apple spent $7

million" [67] The companies increased their spending in this area from 2016 and this, according to the Time, is due to the increasing scrutiny for their dominance in the digital market and their impact in 2016 US elections – in particular Facebook has been criticized for letting Russians use the platform to reach US voters, the same happened with Google's platform YouTube. Russians were able to use the platforms advertising their groups and posting fake news and trolls to influence people's votes and create instability in the USA. This was done only with posts and can give us an idea of how much power of political influence could have the platforms themselves.
The lobbying can be direct or indirect. For example, according to Stucke [62] direct lobbying is what Google used the week after FTC investigations about the company for monopolistic abuse became public: Google hired twelve lobbying firms and increased its spending in lobbying by 88%; at the same time there were some meeting between the company and FTC but the content is not public. The FTC, contrary to the staff's recommendations, closed the investigations shortly after. Indirect lobbying is taken on through articles, academic initiatives, …

In Image 5.4, 5.5, 5.6 and 5.7 we reported how much GAFA companies spent in lobbying from 2013 to 2017 to US government. [68]

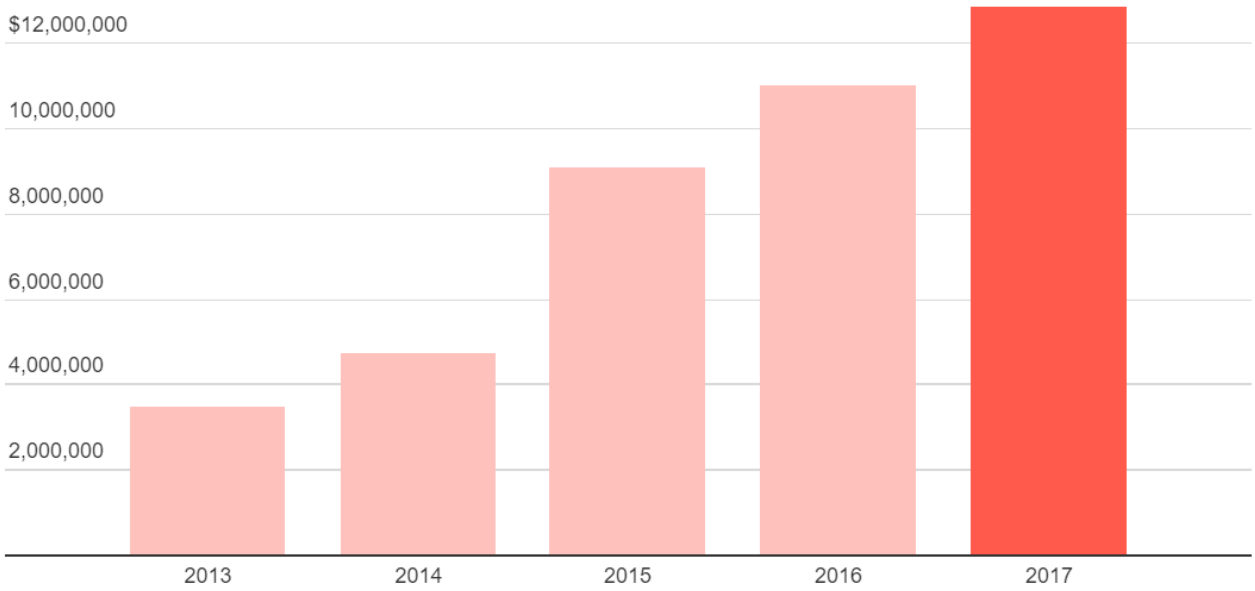

Image 5.4 Amazon's annual lobby spending from 2013 to 2017. [68]

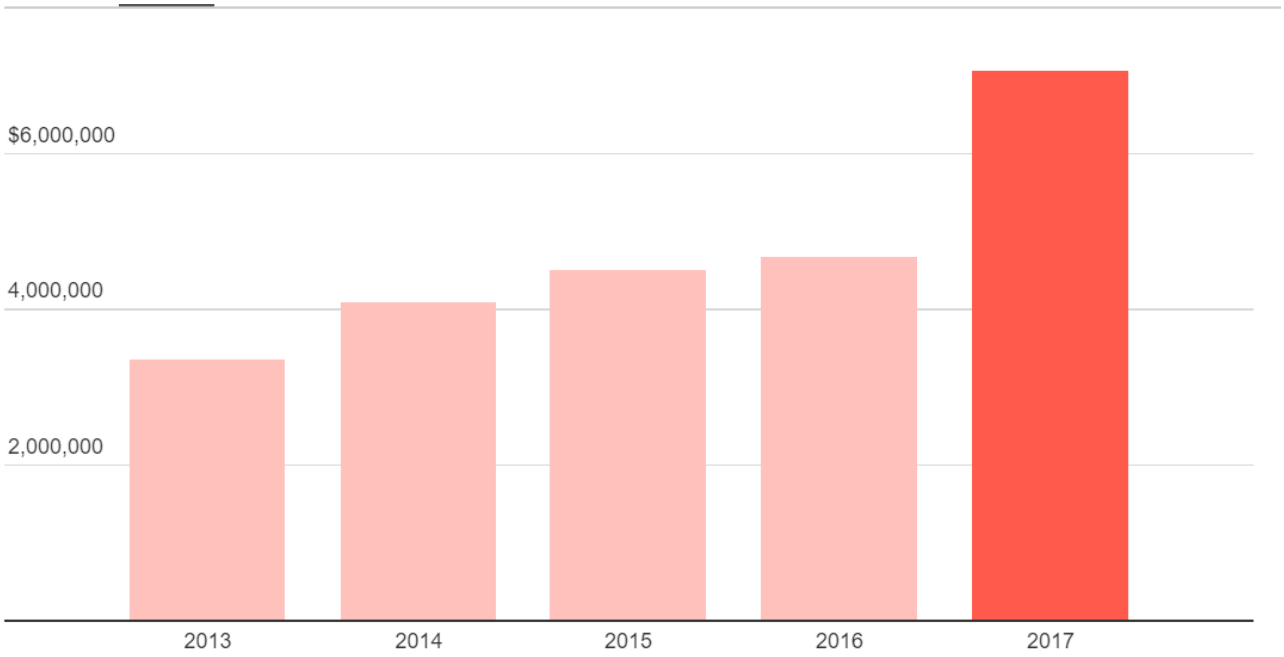

Image 5.5 Apple's annual lobby spending from 2013 to 2017. [68]

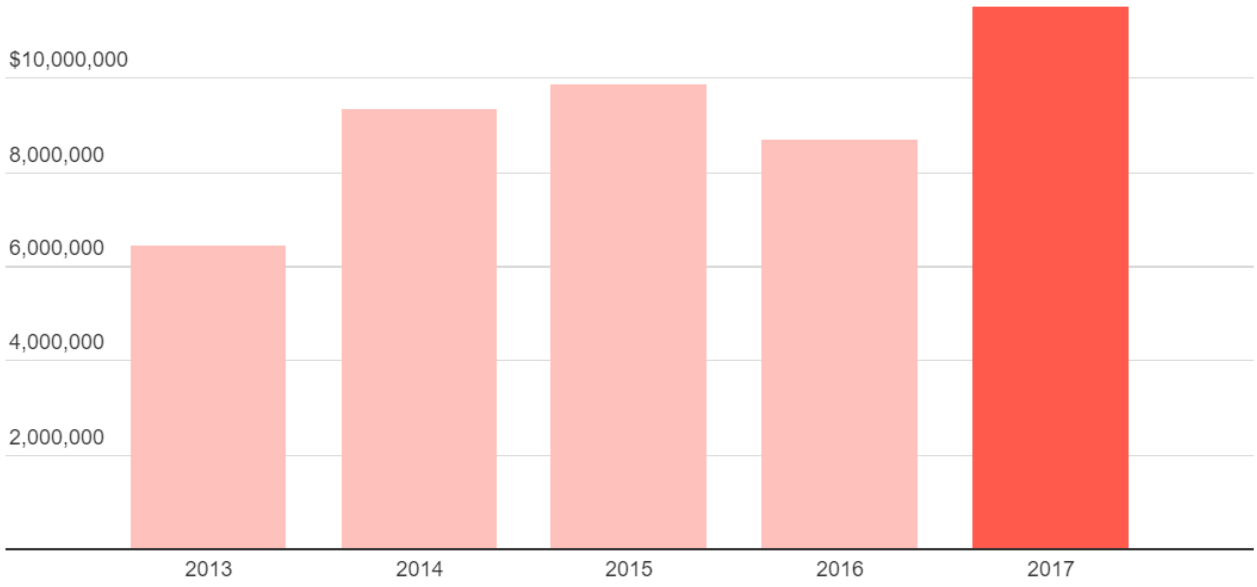

Image 5.6 Facebook's annual lobby spending from 2013 to 2017. [68]

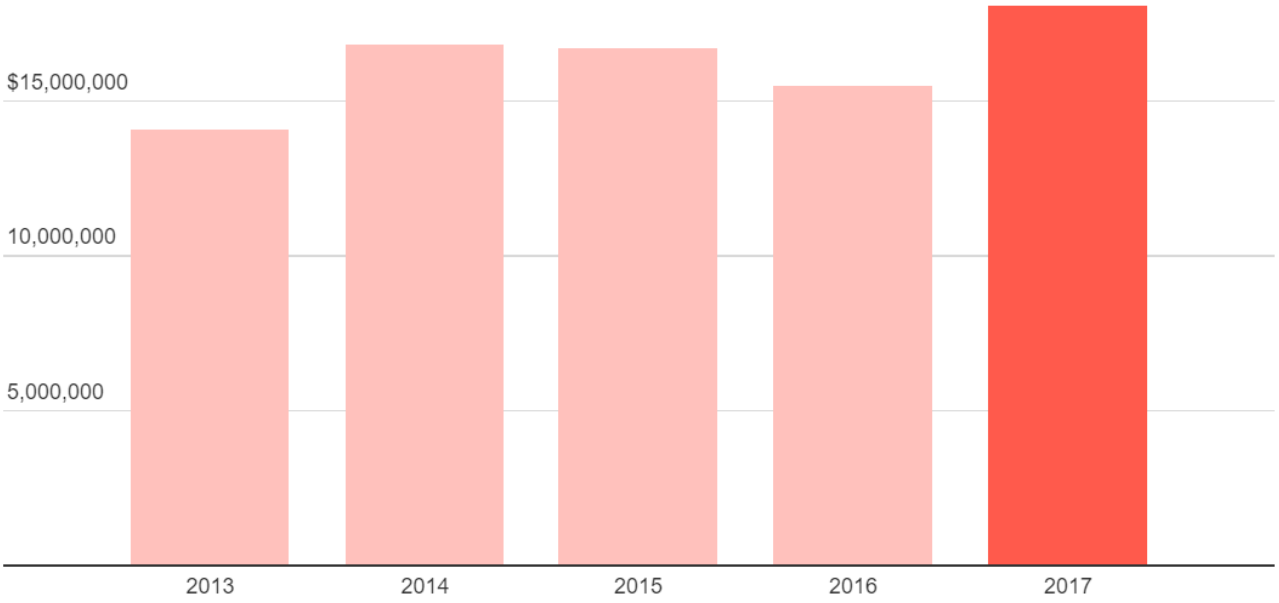

Image 5.7 Google's annual lobby spending from 2013 to 2017. [68]

Google is the company that spent the most in lobbying to US government in 2017, over 18 million dollars. The company lobbied on almost every policy decision (data privacy, corporate tax reform, Trump's banning executive orders, government surveillance, etc..) and also on the new technologies that it is implementing, like autonomous vehicles. [68]

Lobbying is not the only influence power that tech giants own. They also have the ability to influence people and the public's perception of right and wrong. The way the search results are ranked on Google can influence the vote of the ones that doesn't know who to vote; more and more people nowadays use Facebook to discover daily news. With the power they own, GAFA companies can make users see what they want: they can actuate censorship if they don't want the public to see something, blocking the content they want on the platform. Online platforms can reach users like no other monopolistic firm would be able to do, interacting with them and personally knowing them thanks to data. This is confirmed by the decline of newspapers' advertising revenue registered after the digitalization and, then, the use of Google or Facebook for daily news.

5.2.3 Monopolization of adjacent markets

Another leveraging strategy consist in using the dominant position in one market to acquire power in another one. This can harm consumers that in a fairer situation would be provided with a wider range of alternatives and could choose one with better quality for them. For example, Google was fined by the Commission in the Google Shopping case for this reason, but the company is using the same technique, exploiting the dominant position in the search engine market, even in other areas. Also Amazon has been accused of this practice, because the company has been placing in the "buy box" its own product, along with labels like "Amazon's choice" or something similar, without them being the cheapest or the best reviewed. The consequence is that consumers are more likely to buy an Amazon's product without realizing they could have found on the platform better and cheaper options. This leveraging strategy, then, is utilized when the company controls the platform's content and directly compete with other businesses that rely on the platform. (see section 5.4)

The development of new products like digital assistants that we discussed before, pose competition problems not only for privacy issues or for the huge amount of data collected, but also for this kind of practices. In fact, while, even if it would take a more detailed search and more time spent on the platform, a user is able to find a better and cheaper alternative on Amazon.com instead of buying directly the most visible Amazon's product. But for a user that owns Alexa and that can shop directly talking with her, asking for a product and receiving a direct and unique answer in a faster and easier way, would be more difficult or almost impossible to find such alternatives.

5.2.4 Exclusivity agreements

We studied various cases about this practice, like the booking.com one (4.9.1) or the Amazon e-books one (4.6.1): the practice consist in imposing clauses or conditions by which the other party gives some exclusivity to the platform or offer to it a better or the same deal as the one offered to competitors. This can concern prices, like we discussed in the previous chapter, but also other parameters. For example, an important issue is the default option: being the default option is something exclusive that has very great value. Google paid one billion dollars to Apple to be the default search engine on the iPhone, and the company also reached agreements with the browsers Mozilla Firefox (even if such agreement didn't last long and Mozilla made another one with Yahoo) and Opera. The case still pending of Google AdSense also has to do with this practice.
Apple has also been accused of abusing of this practice in the music business, since the company has been signing exclusive licenses with particular artists to restrict the supply of music of its streaming competitors: in this way their content was launched first only in iTunes platform before being available in other ones.

5.2.5 Exclusionary conduct

Online platforms can also leverage their power to exclude rivals from the market. In general, this anticompetitive practice can be done in two ways: predatory pricing where "*a seller offers buyers excessively good deals in order to deny business to rivals and weaken their abilities to compete*", and raising rivals' costs, where "*a seller takes actions to make it more costly for rival sellers to serve buyers, thus weakening the rivals' abilities to compete."* [10]

The peculiarity with online platforms is that its characteristics make it easier and less detectable by scrutiny to actuate these practices, since it is difficult to distinguish between an "innocent" competitive conduct and a harmful one. As OECD points out, the existence of network effects "*give rise to demand-side economies of scale that allow a platform to benefit if it can use exclusivity as a means of limiting participation on rival platforms and, thus, raising rivals' costs (i.e. weakening their ability to provide user benefits)* " and *"can create mechanisms by which a supplier can successfully weaken or eliminate rival suppliers through conduct that denies them scale. Indeed, at least in theory, a weakened rival may enter a "death spiral," whereby it loses users, which then triggers the loss of more users due to the loss of network effects, which then leads to the loss of still more users, which then... Thus, the existence of network effects may heighten concerns regarding the possibility of exclusionary behavior."*[10] The problem is that it is difficult to use traditional indicators with digital platforms to detect an exclusionary conduct, since these are based mainly on price-cost tests. For example, in 2007-2009 it was argued whether Google France was using predatory pricing strategy: in fact, the map services didn't charge users neither sold advertisement, charging zero prices to both sides of the platform in the short run while, in the long run, it would have raised price once weakened or eliminated competition. The problem in detecting this behavior

as anticompetitive relies on the fact that has to be proven that the strategy would have been profitable to Google, thus if zero pricing would have been a good investment even if it didn't affect rivals. Finally, "*the court reasoned that Google must not have engaged in predation because market conditions were such that Google had no chance of recoupment through the mechanism of driving rivals from the market.*"[10]

Khan [21] discusses how Amazon used the predatory pricing strategy to weaken and acquire a rival. In 2008, a company named Quidsi was having great success in the e-commerce market, and it had three subsidiaries: Diapers.com, Soaps.com and BeautyBar.com, respectively focalized in baby care, household essentials and beauty products. Amazon tried to buy the company in 2009 but failed, so it began to cut its prices of baby care products on Amazon Marketplace by 30%, using a pricing software that monitored Quidsi's prices to response lowering Amazon's ones. In 2010 Amazon also launched the Amazon Mom program, offering Prime's two-days shipping membership for free for a year. After not too much time, Diapers.com started slowing under Amazon's aggressive price cutting and finally gave up and Amazon was able to buy Quidsi in 2011. After the acquisition, Amazon restored the normal prices in the baby care business.

5.2.6 Monopsony power

Monopsony power is defined as market power in the labor market, the ability of firms to control a large portion of workers and exploiting bargaining power over them due to the fact that there is little competition for workers in the labor market, dominated by few companies.

This is an issue that comes up with digital monopolies, since their market power lead to monopsony power. The main implication of such power concentration in the working environment is that these firms are able to set wages and even change the way wages are set. They are able to reduce average wages for workers, knowing that it would be difficult for them to quit and look for another job, and they are also able to change entirely the paying structure. It is a form of "wage discrimination" complementary to the "price discrimination" technique used for personalized pricing: monopsonist are able to set different wages to different workers according to their personal condition.

Steinbaum [69] analyses evidences of the existence of such power in the labor market: first, there are earnings inequalities between similar workers that work in different firms in the same market or even in the same firm; the once substantial large firm wage premium has decreased during the last years and this proves how it is employers' decision whether to share with their workers the premium profit derived from scale, thus the existence of an high bargaining power (monopsony power). Moreover, evidences from the real world shows that employers are able to impose disadvantageous terms on workers without compensation, through the use of non-compete clauses to limit their outside options: in a competitive work environment, the imposition of such restriction clauses should imply a compensation wage, but evidences shows that the contrary happens and wages are reduced. Some platforms even classify workers as independent contractors, making them lose all benefits derived from being employees, like assurance, vacations, pregnancy and sickness leave, and so on. This last one is particularly typic of digital platforms, since for digital works like giving rides on Uber, the company precisely states how it is not provided a service but rather a software for matching supply and demand, so there is no working relationship between the firm and the workers.

The consequences are lower wages growth and bigger inflation swings, problem that has been detected widely in US, where these companies have even more monopsony power than in Europe: someone call this the "Amazon effect", underlying how GAFA companies are protagonists. Big tech companies are, in fact, accused of collusion: according to criticism, their restriction clauses are meant to keep workers away from competition and keeping wages low. Amazon is particularly criticized, how the "Amazon effect" name shows, for exploiting its monopsony power mostly in the books market. For example, last year there was a dispute between the company and Hachette[7], a major publishing house: Amazon demanded lower prices to Hachette's books, and when the company received a refusal, it started exploiting its monopsony power by tricky tactics like offering longer delivery terms to the publishing house's books.

5.3 Google and data collection

Newman [70] studies the Google case, explaining how the company expanded into new markets controlling more and more users' data and reinforcing its core monopoly in the search engine market. According to his view, Google had various anti-competitive behaviors that have consequences on consumers and their welfare.

5.3.1 Google's dominance

Google is dominant in the search advertising market, and there is little space for competition even if, according to the company, "competition is just a click away". In search advertising, the product sold is the ad that appear in different forms and it is tied to some particular words that users type in their researches. Moreover, the ads can also depend on users' data: the search advertising platform, Google in this case, collect data from different sources (Gmail, YouTube, search history, user location on Gmaps..) and shows ads specifically addressed to that particular user. The more the platform is able to collect data about that user, the more it can personalize ads. This ability of search advertising platforms makes this kind of advertising efficient, unique and different from the mere traditional display of advertisements. In search advertising, advertising companies don't pay the platform to put ads on its pages, but they pay every time a user click on the ad: this is called CPC (cost par click) price.

Google's dominance in search advertising is clear since it is the only company making profits in this market. The only valuable competitor of the platform is Microsoft with Bing, but the company began to make profits in this market only after some years and it is making little profits anyway. The question is why a big company like Microsoft is not able to compete with Google in this market, and if Microsoft can't, it is difficult that another smaller competitor could. The fact is that Google receive higher CPC fee from advertising companies: the average CPC on Bing is estimated as four times or five times lower than the Google's. This premium keeps on from the time when Yahoo! was Google's main competitor and its CPC was half of the Google's one, probably one of the main reasons why Yahoo! slowly disappeared from the market. This is a very high barrier to entry, since every competitor should sustain the same fixed costs than Google, but it would have

[7] More details in the article of NYT https://www.nytimes.com/2014/05/10/technology/writers-feel-an-amazon-hachette-spat.html?module=inline&mabReward=relbias%3As%2C%7B%221%22%3A%22RI%3A8%22%7D

fewer entries, since its CPC would be lower and, of course, it would be really difficult to compete with Google's reputation. This explains why "competition is only a click away" is a little bit difficult to put into practice.

Google was able to obtain higher CPC fees thanks to its knowledge of users given by the possession of big amounts of users' data. The company maintained its dominance in the search advertising market with exclusive agreements to put Google Search as the default search engine and its strategy was, and keeps on being, to acquire more and more data expanding into different markets, tying all its services together and building a database of information on every user that is almost impossible to reach for competitors.

5.3.2 Google's weapon: Control of data

Google's aggressive expansion into new markets and the development of new products and services had the purpose to collect more and more users' data to sell to advertisers. From Gmail, another platform to put ads on and analyzing email text to get information, to YouTube, Google Calendar, Chrome and so on. Google distributed Android operating system for free to compete with Apple, clearly not out of charity, the company simply understood the potential of smartphone as a new and better way to collect data and found a way to penetrate also in this market through Android, in order to become dominant with its search engine even in mobile internet. For this reason, Google made agreements with device manufacturers, that could use Android and have Google Play only with the pre-installation of Google Search and Chrome. This caused the reaction of EU Commission (see section 4.4.2) but served to the purpose of obtaining dominance in the search engine market also with smartphone. Moreover, as we said, Google paid also the main competitor, Apple, to use Google Search as default search engine in Safari.
The peculiarity was that Google was able to tie together all this services to its core, the search engine, and between them. When you buy a flight and you put your Gmail address to receive the ticket, Google Calendar automatically register the flight on its platform. When you look for a place in Google Search it will use information about your location from Google Maps to better rank results depending on where you are. All Google's services are correlated and make possible for the company to develop a detailed reconstruction of every user. Newman explains that "*the company's creation of a single user data profile system across all its products means that a user is never truly using one product separately, but rather providing data used by advertisers across all of Google's products."*[70] During the years, Google changed from intermediary platform into something else: offering "specialized search services" made possible for users to find what they need without leaving the Google Search results page, and for Google to extract even more data. To reach this point, Google started acquiring companies like ITA (flight data company), Sparkbuy (comparison shopping site) and so on, so that, for example, when you are looking for a flight from one place to another, Google is able to give you results and information about fares and prices directly in its results page. This is the most emblematic confirmation of how the company is using all it can to get more data and redirect all to its core search engine. So, favoring its product on its search engine platform, a practice sanctioned by the EU Commission, serve to this, to collect more users' data, because "*additional specialized search data on users increases the value of the general search advertising that Google sells."* [70] Google don't need to control these markets, the company only need to keep away competitors from powerful data sources, and take from these related markets all the data for itself: this made possible the privilege of obtaining higher fees from advertising companies, that knew no one could give them more accurate and detailed data than Google, no one could afford such a precise targeting of individuals. The tying between its services was done even

better with the introduction of Google's Social Network, Google+: "*The company launched Google+ with an explicit aim to better integrate user data across Google's services. All Google wants you to do is create a profile and link to some friends with it. After that, Google really doesn't care if you never visit again, as long as you sign in for any other Google service (like Gmail), and then recommend an ad or a Web site once in a while. Whether a user is watching videos on YouTube, sending email from a Gmail account, checking for updates at Google News, checking their location on an Android phone, or buying a product through Google Offers, this data feeds the accumulating profile that Google has not only on the user as an individual, but on aggregated profiles of people like them that Google can package for its advertisers in ads broadcast on any and all of those products."* [70] With all this information, Google can combine specialized search data with behavioral data, having an advantage that no competitor could have.

In its urge for data, the company was criticized. One example is Google Street View: photos were done in all the world in order to integrate them to places in Google Maps, but it turned out the real purpose of the company was to identify all WiFi spots for routers in all the world, in order to combine this data with GPS on smartphone and provide a more accurate position. The fact was that Google obtained this information by illegally download big amount of data from Wifi routers in people's houses, that included also their sensible data like medical history, sexual preferences, and so on. Google was sanctioned from various countries for that, but it allowed anyway the company an advantage in the geolocation market that no one had. Some countries even consider Google Street View illegal since the photos taken can include people or personal facts and could harm privacy; the company claims how the photographed sites are public. With the introduction of Android, Google kept on easily with its strategy: "*As the Google Street View controversy unfolded and the company had to scale back its collection of geolocation data via that method, company executives emphasized internally how it deployed Android smartphones to help continue its geolocation mapping. Android users could collect the same kind of WiFi hotspot data Google Street View cars had previously provided."* [70] With this method, Google's geolocation mapping had no rivals: in 2012, Apple received public complaints for the inaccuracy of its mapping service, that was incomparable with Google Maps precise data: the debate was so strong that the Apple mapping software developer had to resign.

During the years, Google was accused several times of illegal activities to obtain users' data, like the Google Street View example; the company was sometimes sanctioned but the advantage given by the results obtained with its potentially illegal conducts was far higher than the price it had to pay when punished.

5.3.3 Consumers' harm

The first harm that directly affect consumers is the fact that the higher fees that Google imposes on advertising companies are inevitably passed onto them with higher prices in the final goods.

In addition to this more general consequence of Google's behavior, consumers are harmed by the fact that they give away private data of great value without realizing how much value it has. Moreover, the lack of competition that Google faces makes it also difficult for eventual competitors to offer better conditions to consumers, providing a better privacy protection for their data, so consumers are not able to understand that there could be a better option and they think that what Google is offering them is the best possible. Microsoft is lately trying to do so by its "Microsoft Reward" program: the company gives points to the users that use Bing as search engine and when you have enough point you can get rewards like gift cards; the difficulty in doing so is that, as we

explained, Google benefits from higher CPC so for other companies it is more difficult to offer better deals, and Microsoft is trying to do it and can try to do it thanks to the fact of being a very big and wealthy company that can also suffer losses from the search engine market.

The result of Google giving away users' personal data to advertisers is that these are able to discriminate more precisely and actuate personalized pricing (see section 5.1.2), practice that can harm consumers as we discussed in the relative section.

5.4 Private label business: Amazon's leveraging strategy

5.4.1 Amazon Marketplace

Amazon Marketplace is the company's retail platform, known in all the world and with 183 million visitors per month (data retrieved in March 2017), the double of its closer and biggest competitor, eBay. [71] Amazon Marketplace has built consumers' trust throughout the years, putting consumers in the first place, more than all with its Prime membership, that ensured one-day deliveries, and its reliability. Not even the most known brands benefit from the trust that consumers have in products bought from Amazon. Amazon, indeed, makes sure that integrity is maintained with its third-party sellers: more or less half of the products purchased on the platforms it's sold from third party vendors that can subscribe on Amazon as Professionals (paying a monthly fee) or individuals (paying fees for every product unit sold). Moreover, they have the option to deliver products on their own or to rely on Amazon FBA program (Fulfilled by Amazon); in this case Amazon is responsible for the distribution.
Amazon, in this way, being the intermediary platform but having the control of the platform and sometimes also of the distribution part, collects data not only from consumers' purchases history and interests, but also from merchants' sales and reviews, having the possibility to use Marketplace as a sort of "laboratory" to understand how the demand is evolving, what are the trends, which products are sold and what the consumers wants most.

5.4.2 Private labels: Amazon's weapon

Private labels are brands owned by a retailer: these are produced by a third party manufacturer but sold under the retailer's brand name so that the latter has the control of the product in terms of marketing, packaging and distribution. Private labels have various advantages, given that they require small capital investment and the marketing costs is way lower since they don't have to cover for a known brand: the consequence is flexibility in production and quality at a lower cost. In this way, retailers, in our case Amazon, are able to offer a product of the same quality of a well-known brand but a very lower price, up to 40% less than the branded one.
Private label brands are disrupting brand-name product since they are cheaper and of similar quality, and consumers are starting to care more about price and quality than about the brand name. More than all, now that the retailing is also online, it is more difficult for brand-name companies to invest successfully in brand building, and in a platform like Amazon where consumers have the opportunity to review product and read other consumers' reviews, it is easier to choose a private label brand product with good reviews and lower price even without knowing the brand. In another situation, a disinformed consumer would decide, maybe, to buy the brand-name product relying on the trust he have towards that brand; now that information is easier to obtain it is more likely that between a brand-name product with good quality and reviews and the private label brand product with the same things but way lower price, the consumer would choose the latter.

Amazon has been introducing private label brands since 2009. At the moment the company has 20 private labels brands in 18 different categories, ranging from food to electronics: the most known is certainly Amazon Basics, that accounted for 85% of the company's private label sales in 2017, while most of the other brands don't even bare the company's name and many consumers don't even know they are buying an Amazon product. The products are sold only on Amazon Marketplace platform. Some expert sustain that these are the results of an anti-competitive strategy that Amazon pursued for years: Amazon uses Marketplace as a laboratory, analyzing sales and consumer behavior data about third party products to understand the performance of products sold on its platform and then introduce its own products in the platform according to the results of its analysis. In this way, before introducing its own private labels brands products, Amazon knows they would be profitable: for example, the company could invest in a product that had great success offering a private label brand alternative and giving it more visibility on Marketplace (Amazon can do this since it controls the platform); Amazon can do this without taking risks for putting a new product on the market, since the risks were on the third party seller that in the first place started selling its product on Marketplace because they *"bear the initial costs and uncertainties when introducing new products; by merely spotting them, Amazon gets to sell products only once their success has been tested".* [21] Randy Miller, a former director at Amazon, provided further it evidence of this with his statement of "*if you don't know anything about the business, launch it through the Marketplace, bring retailers in, watch what they do and what they sell, understand it, and then get into it"*. [12] Research confirms Mr. Miller's statement, indicating that talking about a product category, "*entry by Amazon is more likely for products with higher prices, lower shipping costs, and greater demand, with the likeness for entry increased by the average consumer rating of the product".* [71] The result is that Amazon is largely benefiting from its private labels business: Amazon Basics holds higher market share than branded competitors in many product categories, for example in online battery purchases it surpass Duracell, Panasonic and Energizer; in online purchases of diapers it came only after Huggies and Pampers.

In addition to creating its own private labels brands, Amazon has been acquiring companies with an already established private label brand, for instance the company bought Whole Foods in 2017 that was already very well known in US for its private label brand 365 Everyday Value. This attitude shows how Amazon is exploring continuously new product areas to enter in.

5.4.3 Anticompetitive consequences

Amazon's growth thanks to this strategy pose anticompetitive concerns. With its private label brands Amazon is growing barriers: a 2017 study called "State of Amazon Marketplace" [72] interviewing 1600 Amazon sellers show some interesting outcomes. As we can see from the results in Image 5.8, 45% of sellers on the platform are most concerned about Amazon competing with them, 50% about the high fees imposed by the company and 52% about Amazon taking away their seller privileges.

Image 5.8 Amazon Marketplace Sellers' biggest concerns. [72]

This study show how sellers are losing trust in Amazon and starting to realize how its business it's trying to do all to favor its brands, by copying rivals' best products, putting these on the platform at a lower prices and higher rank, positioning the rivals in a situation of disadvantage and causing a decrease in sales for them. To ensure retailer compliance, Amazon uses service level agreements (SLAs) providing sellers with a feature where they can view their performance scores every day, with the fees and the fines they accumulated for poor scores: in fact, the company sanctioned aggressively third party sellers that don't comply with delivery schedule, need re-packaging and so on. At the same time, sellers can't do anything more than complain, because they can't give up being on Amazon's platform since without being there they wouldn't be competitive: they depend on Amazon. "*This feature of Amazon's power largely confounds contemporary antitrust analysis, which assumes that rational firms seek to drive their rivals out of business. Amazon's game is more sophisticated. By making itself indispensable to e-commerce, Amazon enjoys receiving business from its rivals, even as it competes with them. Moreover, Amazon gleans information from these competitors as a service provider that it may use to gain a further advantage over them as rivals—enabling it to further entrench its dominant position.*" [21]

There are three forms of manipulation that Amazon uses to this purpose: product search, product cost and scalability. The first type is the one we just discussed, manipulation of the way consumers search for products in the marketplace: Amazon controls its platform so it can leverage its ads and put labels like recommended products (Amazon's choice, Best Seller..) to shift focus towards its products making them more visible and making more difficult for third party sellers to merchandise theirs. Researches show that 70% of consumers select a product from the first page results, and less than 10% goes until the fourth page: this give an idea of how difficult can be for third party sellers products to be found. Sometimes, in order to gain ranking, sellers decide to pay a 10-20% fee on sales to Amazon to warehouse and ship their product for them ("Fulfilled by Amazon" program). It works, since according to a report conducted on 250 products "*Fulfilled by Amazon vendors and Amazon itself were just about the only sellers — 94 percent of the cases we analyzed — that ever won the buy box without having the cheapest product.*" [72] The second form of manipulation is

product cost, since Amazon is able to offer, as we said, private label brand products at the same quality of the branded ones but at a lower price. Searching on Amazon.it "Duracell batteries" the first result shown are the one of Image 5.9: even though I specified in the research the brand "Duracell" the first result shown is Amazon Basics batteries, with a price of 13,25€ for 48 batteries. Immediately after, we find the Duracell ones, provided with 42 reviews against the 1080 of the Amazon Basics ones, and at almost the same price (something more since it is 13,96€) but with half the number of batteries, 24 instead of 48.

Image 5.9 First two results from the research "Duracell batteries" on Amazon.it

The unit price is half and the private label Amazon Basics for batteries has good reviews, fast delivery and easy returns: this make it more attractive to buy these ones.
The last form of manipulation is scalability and it refers to Amazon's ability to completely control its marketplace platform.

It is very difficult to demonstrate the anticompetitive effect of Amazon's tactics since it could be seen just like vertical integration, a totally competitive practice.

5.4.4 Consumers' harm

Bezos's company has always claimed to be consumer centered, putting consumers at first and doing everything to satisfy them. Anyway, the practice described is not only disadvantageous for sellers, but also harms consumers. Some investigations reported how it affects consumers: giving advantage to its products in the product search Amazon hides better options where consumers would pay less. The study conducted on 250 products revealed how "*an Amazon customer who bought all the products from the buy box would have paid nearly 20 percent more than if they had bought the cheapest items being offered by other vendors".* [72] In order not to be tricked they could do a depper research since "*sellers who don't win the buy box are placed on a page called "More Buying Choices," on a list that Amazon describes as ranked by price plus shipping."* But even doing so, in the "price + shipping" ranking Amazon omits shipping costs only for its products and the ones that have a membership with Amazon, so consumers can also be tricked to think one product is cheaper and then, at the end of the transaction, they see they have to pay also the shipping costs that were not specified before: *"since Amazon doesn't include the cost of shipping for*

itself and its fulfillment partners, the rankings on that page can be misleading." [72] This led consumers to make uninformed choices, reducing their welfare.

5.5 Complaints to the European Commission

Spotify and other European tech firms sent a letter [73] to the European Commission complaining about the anticompetitive behavior of "major online platforms" stating that they're not acting anymore like gateways but more like "gatekeepers" and that something should be done about it. These companies identified some of the weapons we described and underline the threat of the digital economy, if not regulated.

5.5.1 Background: Spotify VS Apple

Some years ago Spotify complained about Apple, accusing the company of anticompetitive behavior since its Apple Store's subscription policies *"punish third-party music services that use Apple's platform, while boosting Apple Music*". [74] In fact, at that time, Apple charged a monthly fee up to 30% of sales for the developers that use iTunes billing service; at the same time the company doesn't offer an alternative and making impossible to promote subscription options outside the apps. In order to recoup these fees, Spotify has been offering its subscription on Apple devices at a higher price, but since the introduction of the competitor Apple Music, the company started to complain about this policy: in June 2016 Spotify wrote a letter to Apple accusing the company of "*causing grave harm to Spotify and its customers*" by blocking the Spotify app update in its Apple Store, in order to give advantage to its own Apple Music streaming service. Apple responded saying that the same treatment is applied to every developer and that the updates were not compatible with Apple Store's policy.

5.5.2 The letter

The letter was sent on 4 May 2017 and it was signed by the representatives of 10 companies, including Spotify, Deezer and Rocket Internet. In the letter, the companies describe major online platforms, when working well, as *"gateways to the digital economy: they enable consumers to access innovative services; they spur innovation and help small businesses and start-ups reach new markets; and they drive investment, growth and employment."* and outline as a problem *"their strong incentive to turn into gatekeepers because of their dual role, instead of maximizing consumer welfare, they can and do abuse their privileged position and adopt B2B practices with adverse consequences for innovation and competition. These practices range from restricting access to data or interaction with consumers, biased ranking and search results to lack of clarity, imbalanced terms and conditions and preference of their own vertically integrated services.".* Finally, they demand to the Commission action since "*today, the imbalance of resources between online platforms and their business users, which are often much smaller businesses, requires additional measures, including setting out specific rules guiding the interactions between platforms and their business users*." [73]

In the letter there are not explicit reference to some platform, but it is evident that they refer to the four GAFA companies when they talk about "*major online platforms - be they mobile operating systems, app stores, search engines, marketplaces or social media platforms*". The companies demand extra rules for the dominance of online platforms, obviously because they felt the lack of competition and the difficulty of finding a little hole to enter in a market that is already taken by the four tech that are present or expanding in almost all digital business areas.

5.5.3 Possible outcomes

The letter demonstrates how the world is beginning to worry about the possible outcomes of GAFA's dominance. According to Galloway [18] it is very clear, for example, what is Amazon's goal with its anticompetitive leveraging strategies: Amazon is headed towards taking over all the e-commerce business, driving sellers (its clients/competitors) out of the market, replacing all the deliveries still done by delivering companies with its own service. And once acquired a scale impossible to reach, being the only real e-commerce reality, start to raise prices to make profits. Facebook was condemned to pay a fine of 110 million for changing WhatsApp's privacy policy in order to share its data with Facebook, doing exactly what it claimed it wouldn't do when the Commission was investigating on the merger: the fine was a simple price to pay in order to gain so much more. Right now Facebooks owns the two main social networks used in all world (Facebook and Instagram) and the messaging app that made everyone forget about SMS system (WhatsApp) : the company's final goal is to "connect the world". Supposing they would achieve that, the company would have a power over the public audience like no one ever could, being able to drive people's thoughts even more than now.

6. The way forward

As we discussed in previous chapters, concern is growing about the scale and perceived power of the four big digital platforms (GAFA), but also of other fast growing companies of the sector (like Uber, Netflix, Booking.com…). In this chapter we will explore possible solutions to overcome the threat posed to competition policy by online platforms. We will start proposing solutions to overcome the difficulty of applying traditional economic measures to these companies and then we will list the players that have a role in regulating digital platforms.

6.1 Economic indicators

As we explained in chapter 1, online platforms have a particular price structure since they operate in two/multi-sided markets: they can charge a higher price on a side and offer a price below cost to the other one (the "subsidized" side). It is evident that the traditional static indicators can't be used in this digital context, where the market boundaries are blurred and competition is dynamic. We will describe the most used indicators for defining the relevant market and assessing market power, explaining why these are not applicable in online platforms' two-sided markets and what could be used instead.

6.1.1 Market definition

In order to determine market boundaries, the most used indicator is **SSNIP test** (small but significant non-transitory increase in price), that "*defines the market as the smallest set of substitute products such that a substantial (usually five or ten percent) and non-transitory (often one year) price increase by a hypothetical monopolist would be profitable*". The test "*is implemented by first simulating a given price increase above the current level by a hypothetical monopolist who owns just one product and, as long as that leads to estimated losses in profits, progressively increasing the number of products owned by the monopolist and simulating a price increase of all the products the monopolist owns. When the hypothetical monopolist does not estimate profits to decline following a small but significant increase in price, the set of products owned by the monopolist in the last simulation constitutes the relevant market*." [10] With SSNIP, traditionally, we are then able to identify the relevant market, the smallest market where the monopolist has market power and can raise prices to make profits. It is clear that in a digital context where platforms offer free services by monetizing users' data this is not applicable, and even with digital platforms where all sides of the multi-sided market are charged, "*applying the SSNIP test will require that the theoretic rise in price be applied to all sides while taking into consideration the impact network effects."* [39] Moreover, competition among digital platforms is not so much about price, but about quality instead: for example, "*one important dimension of quality is the size of the network effect, i.e. the number of (some type of) users on the other side of the market"* [10], or the privacy policy offered by the platform. For this reason, some proposed to substitute SSNIP with SSNDQ (small but significant non-transitory decrease in quality) or SSNDPP (small but significant non-transitory decrease in privacy protection). According to OECD, *"in a two-sided market in which one side does not pay, the quality on the non-paying side of the market also depends on the price paid on the paying-side"* [10], so the proposed solution is to apply both SSNDQ to the side that doesn't pay and the traditional SSNIP to the charged side. With this assumption, both tests would be linked and "*a*

SSNDQ test may be a reasonable solution to address the issue of market definition on the non-paying side of the market when the candidate substitute product on that side of the market are for free". [10]

Other quantitative methods to measure market boundaries, such as demand functions estimates, elasticities, present the same issues. Network effects influence changes in demand functions and should be taken into account, otherwise there can be overestimations in demand reaction to some variables.

6.1.2 Market power

6.1.2.1 Problems detected with traditional indicators

It is tricky to determine market power in a digital environment, since even differentiating competitors from costumers it is difficult in some cases (like with Amazon). The traditional indicators don't apply and should be revisited. An indicator widely used to determine market power is **market share**: anyway, in the dynamic digital world market shares can drastically change in short periods of time so this indicator is less relevant and it is also more difficult to calculate. In fact, an online platform that operate in multi-sided market could have different market shares in these markets, thus it would be more difficult to compare these shares with those of the competitors, and "*it is important to consider how asymmetric competition will affect the outcome of such assessment, as online platforms may also have different positions in overlapping as well as distinct related markets."* [39] Moreover, it would be necessary to consider that is not always possible to measure market shares: for example, if a side of a multi-sided market is not paying, it is not possible to compute market share in the traditional way and another assessment should be done based on the value of the transactions in that market. Finally, competitive pressure could be strong even in presence of high market shares in these markets.
Various sources agree then on the fact that market shares are not a relevant indicator to assess market power in the digital economy and there are several approaches proposed to assess market power of an online platform. First of all, the nature of competition should be considered, looking to every side of the multi-sided market of the online platform, since there could be different competition levels: if a platform engages an anticompetitive conduct on one side of the market, a competitor could respond by doing the same on the other side of the market.
Another important issue to consider should be whether, over time, commission levels/fees on one side of the market increased while quality on the other side remained unvaried. To assess how much network effects affects the concentration of the market, the multi-homing level should be analyzed: even if other option is available, it should be considered how many customers are loyal mostly to one platform in the free side of the market and how many customers in the paying side of the platform, consequently, single-home.
Barriers to entry and expansion are also important: more than all, when a platform benefits from a first-mover advantage this can lead to winner-takes-all outcomes: switching costs can be elevated because of consumers' habits and data given to the platform.

We already proposed a revisited way to calculate the **Lerner Index** in a multi-sided platform context (see section 2.3.2) in order to assess market power. Another famous indicator is the **HHI index.** This indicator it is a measure of market power commonly used to decide if a merger between

two firms could lead to an excessive concentration of market power. In the market of the merger, where n total firms operate, the index is defined as the sum of each firm's market share s_i:

$$HHI = \sum_{i=1}^{n} s_i^2 \qquad (6.1)$$

The higher HHI, the more concentrated it is the market: the maximum value of HHI is 10,000 and is given by a firm with 100% of market power. Specifically, "*according to the U.S. merger guidelines, markets in which the HHI is between 1,500 and 2,500 points are considered to be moderately concentrated, and markets in which the HHI is in excess of 2,500 points are considered to be highly concentrated".* [39] The assumption when considering HHI value to decide whether to approve a merger is that the firms' pre-merger market shares remains unvaried after the merger. This implies that if there are two firms merging in the market, the HHI variation and the post-merger HHI would be:

$$\Delta HHI = 2s_1 s_2 \qquad (6.2)$$

$$HHI^{post} = \sum_{i=1}^{n} s_i^2 + 2s_1 s_2 \qquad (6.3)$$

With this calculation, the competition authorities assume that if the post-merger HHI is between 100 and 200 points higher than the previous HHI, competition concerns could raise, and if the difference is more than 200 points the merger should be investigated further.
Anyway, using HHI index for online platforms is not wise for two reasons: first, it involves calculating the relevant market and therefore use SSNIP test, that, as we said, it is not applicable for multi-sided markets; second, it is based on Cournot competition on quantities and homogeneous products sold by the firms, while in most markets (not only in digital economy) there is high differentiation and the competition is based on other parameters (for example, prices in traditional markets, quality in online platforms). The second reason raises criticism also for the use of such index in traditional markets in general.

6.1.2.2 Proposed indicator

A proposed indicator that could fit for both one-sided and two-sided markets is **UPP index** (Upward Pricing Pressure). UPP "*is based on the idea that a merger changes the firms' pricing incentives in two ways: (i) it creates upward pressure on prices due to the loss of competition between the merging parties' products and (ii) it leads to downward pressure on prices caused by merger-related efficiencies (marginal cost decreases)"* and it is calculated as the difference between the two effects. The UPP of firm 1 when firm 1 and firm 2 merge is calculated as follows:

$$UPP_1 = (P_2 - C_2)D_{12} - E_1 C_1 \geq 0 \qquad (6.4)$$

"where D_{12} is the diversion ratio from product 1 to product 2, (the fraction of sales diverted from product 1 to product 2) P_2 is the price of product 2, C_1 and C_2 are the marginal costs of product 1 and 2, respectively, and E_1 captures possible merger-related cost synergies in producing product 1, measured in relative terms (percentage). Hence, given that the price of product 2 remains the same, the merging firm would like to increase the price of product 1 after the merger as long as $UPP_1 \geq 0$." [39] In fact, before merging, the two firms are competing with each other and if the price of product 1 raises, part of the customers will substitute it with product 2, depending on how much the products are substitutable. Once merged, the portion of sales will not be lost anymore by firm 1 and

this effect will be internalized as the first part of the equation 6.4. The diversion ratio can be calculated as "*the effect of a marginal price increase of product 1 on demand for product 2 divided by the marginal effect of this price change on demand for product 1"* [74] and it is formally defined by the following equation:

$$D_{12} = -\frac{\partial Q_2/\partial P_1}{\partial Q_1/\partial P_1} \qquad (6.5)$$

The second term of equation 6.4. measures merger-related efficiencies, where E_1 is a percentage indicating the efficiency of pre-merger marginal cost of product 1, for example 10%, and its presence can decrease marginal costs of the product and then decrease the incentive to raise prices. Whenever the UPP index is higher than zero, then, the merging firm will be likely to raise prices after the merger and the merging should be investigated by the antitrust authorities.

The index can be applied to every market, independently from its characteristics and it can be used also in two-sided markets. Affeldt and al. [74] analyze the application of UPP index to two-sided markets: in this case, the platform sets two prices, one for each side, and the sales of product 2 are affected by it on both sides. The online advertising industry can be used as example, indicating A as the advertising side and C as the consumer side. Then let's suppose an increase of price P_1^A on the advertising side in the firm 1: this would lead to a decrease of the quantity Q_1^A and this would cause a decrease also in Q_1^C for the presence of network effects in this market. The same would happen with an increase of P_1^C . This means, more in general, that in two-sided markets, quantities in one market are function of both prices on the same market side and quantities on the other market side. We have then two UPP indexes, one for each side, given by:

$$UPP_1^A = D_{12}^{AA}(P_2^A - C_2^A) + D_{12}^{AC}(P_2^C - C_2^C) - E_1^A C_1^A - D_{11}^{AC} E_1^C C_1^C \qquad (6.6)$$

$$UPP_1^C = D_{12}^{CA}(P_2^A - C_2^A) + D_{12}^{CC}(P_2^C - C_2^C) - E_1^C C_1^C - D_{11}^{CA} E_1^A C_1^A \qquad (6.7)$$

Analyzing the equation 6.6, we can recognize the first and the second term as the positive effects derived by the portion of sales shifted from product 1 to product 2 on the advertisement side when the merged entity raises the price of product 1; the third term refers to the incentive to lower the price of product 1 on the advertisement side thanks to merger-related efficiencies, and the last term calculates the incentive to lower the price of the product 1 on the advertisement side thanks to the portion of merger-related efficiencies diverted on the consumer side thanks to network effects. The same happens with 6.7, on the consumer side of the market. As it happened with the one-sided market case, if $UPP_1^A \geq 0$ the merged firm is likely to raise price of the product 1 on the advertisement side; and if $UPP_1^C \geq 0$ on the consumer side. This means that, using UPP index to measure market power and decide whether allow a merger between two firms that operate in two-sided markets, authorities should look to both sides of the market of both firms and estimate diversion ratio of both firms on both sides: in particular the six diversion ratios can't be computed using estimates for demand elasticities as in 6.5 since these are not usually available, but it is possible to collect information on diversion ratios through customer surveys.

6.2 Rethinking regulatory framework

The new digital environment presents challenges, as we stated, so the consequence is to consider whether something should be changed in the actual regulatory framework for digital platforms. We outline some solutions proposed by different sources that could be analyzed for the future decisions.

6.2.1 Merger control

Regarding merger control, as we stated in section 6.1.2, currently used indicators should be revisited or substituted with other ones. Another problem about the actual EU Merger Regulation is that the thresholds imposed by the regulation are not easily met by mergers between online platforms. In fact, these thresholds concern companies' turnovers and, since some digital platforms doesn't have large turnovers even if they are valuable thanks to their particular characteristics, their mergers often avoid scrutiny. Given the importance of scale economies and network effects, a better metric would be **the number of users** together with an estimation of the **size of the network effects.** For example, at the time of the acquisition by Facebook, WhatsApp didn't meet the turnover thresholds, having neither substantial revenues nor many employees, even if the operation was very significant (19 billion euros) and the platform had already more or less 500 million users. First of all, in the digital economy data should be considered as valuable as monetary income, since it has an important role in this context: as "*Ms Vestager pointed out, we are therefore exploring whether we need to start looking at mergers with valuable data involved, even though the company that owns it doesn't have a large turnover"*. [66] Taking again the Facebook/WhatsApp case, what happened was that Facebook was able to use WhatsApp datasets by connecting the two platforms' accounts to better target advertising: this should be taken as a lesson to learn. According to the Monopolies Commission an idea could be "*to supplement the existing turnover thresholds in the wording of the norms to include appropriate purchase price threshold*". In this way, relevance could be furnished to the significance of the operation for the parties involved, rather than to their revenues.

A possible solution outlined by Autoritat Catalana de la Competencia [66] is to look at the value that the parties themselves account to the operation, the economic value of the transaction. A problem with this, anyway, is that this value is decided by the parties so firms could start developing complex payment structures to present the operation as less valuable and avoid scrutiny. Another idea could be to look at the market power hold by online platform using adequate proposed indicators. Another solution proposed is to "*require the notifiers to outline the actual use they will give to the information collected as a result of the merge*"; this solution would "*(i) define the area affected and therefore the potential impact in terms of competition, (ii) prevent the "accumulation of data without a clear purpose" (it has already been indicated that the accumulation of information without a specific purpose only produces a reduction in privacy without leading, at least initially, to a better product or service), and (iii) be consistent with the data protection regulations that make multiple references to the purpose/use/destination of the data obtained as a further limit on their use*". [66] The complications for this solution could be that this limits freedom for the involved firms since it is strategic information for them.

Another problem with merger regulation is that, nowadays, mergers could occur at the very early stage of development of a potential successful company, since major online platforms have the

power and the means (by nowcasting, monitoring competition, ...) to detect possible future threat at the beginning of their growth. For example, let's imagine an app with a new service on Google Play start gaining success: Google can easily notice the increasing traffic towards it and decide eventually to buy it. This pose the challenge for new entrants to compete with incumbents, being purchased far before acquiring scale and user base.

Mostly, antitrust authorities should consider all the angles of a single merger, in particular:

- Considering all the sides of the multi-sided market and the impact the merger would have on them;
- Considering the quality degradation on the subsidized side (the one not charged for the service), in particular data protection and privacy degradation;
- Considering if the data acquired with the merger could strengthen or maintain the power over any market involved;
- Considering if the merger could lead to a growth of entry barriers in any market involved;
- Examining the effects "a posteriori" of past allowed mergers in order to learn from them and foresee possible problems that could occur another time.

Finally, some think that the right decision could be to change completely the way mergers are treated. At the moment, a merger is questioned only if it raises competition concerns, while another approach could be adopted by asking the merging party to justify the decision and prove the social welfare given by the operation so that "*only if operators show that the operation is aligned with the public interest may it be permitted to materialize*". [66]

6.2.2 Competition regulation

As we discussed in chapter 4, Article 101 TFEU and 102 TFEU are the principal ones the European Commission looks at when it comes to competition issues. There seems to be consensus on the fact that, even if there is the need to revisit some aspects to adapt these measures to digital platforms, they are sufficient to deal with anti-competitive behaviors, contrary to the current merger regulation. The major difficulty in antitrust enforcement are the particular characteristics of online platforms and the fact that competition authorities have no examples to take into account, since digital economy is a new and unexplored world, that is in continuous evolution.

6.2.2.1 Proposed solutions

We already outlined the problems is applying the Antitrust regulation to online platforms in section 4.3 of chapter 4: there are issues in proving collusion because digital platforms make use of software and artificial intelligence, it is difficult to define the relevant market and to prove dominance. We proposed the indicator SSNIP for the definition of the relevant market to be substituted with SSNDQ or SSNDPP (section 6.1), anyway, there is a great difficulty on this matter with digital platforms, because their access to data make easier to expand in new markets and to redefine boundaries. For example, Facebook is a social network but recently developed a marketplace that competes with platforms like Amazon or eBay. For this reason, even if it would be a right approach, it is very difficult to measure a percentage decrease in quality or privacy. A solution could be to define a generic data market for online platforms, but this could be too generic and vague. The goal, anyway, is to review the actual regulation and its application to online

platforms rather than introducing new regulations. First of all, there is a need for **greater speed** in antitrust proceedings, since the last investigations concerning major digital platforms took years to reach a decision. This delay is only an advantage for the investigated platform, that "first, it is not prevented during the proceedings from continuing the conduct of which it is being accused; second, the danger that third parties will demand compensation for the conduct is at least reduced for the duration of the proceedings since those third parties will await the outcome of the proceedings as a rule." [76] The process can be accelerated by using technological instruments and tools, providing the sufficient resources and technical expertise. In fact, "*the Commission, in its ongoing investigation against Google, relied heavily on expertise provided by Google itself* ". [40] Moreover, time limits could be imposed for the process of negotiation between competition authorities and platforms during the investigations. Online platforms' business models should be analyzed case-by-case, understanding where and how do every platform get its revenues and study the anti-competitive practices that they engage on but that are not explicitly regulated by the current law. This work should be done in order to define better every type of digital platform, its business model and strategy, and learn from their past anti-competitive practices when implementing the decision-making process for future investigations. Digital platforms' **business models** should be taken as a starting point, in order to understand how these companies make profits and give a better definition of the markets they are operating in and the amount of power they exert in each market; traditional indicators like market shares should be substituted by indicators that focus more on market contestability, like the presence of entry barriers, the size of network effects, multi-home, degree of innovation and all the other characteristics we know determinate concentration in digital economy.

Nooren et al [80] propose a **framework** to be used when investigating digital platforms with the instruments and rules antitrust authorities already have in place. It is represented in Image 6.1.

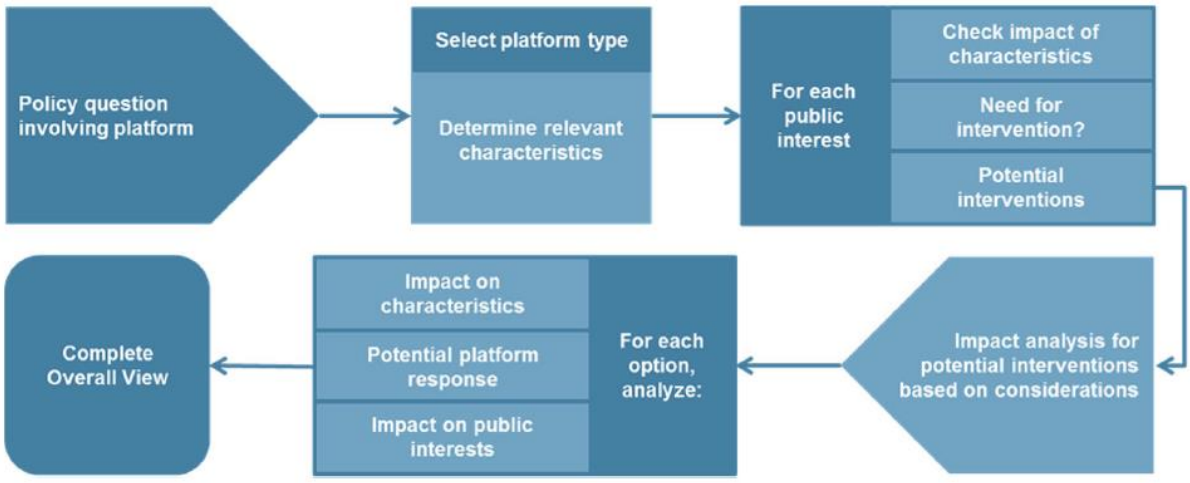

Image 6.1 Framework proposed to investigate digital platforms. [80]

The path is divided in two parts: the forward path and the return path. In the first path the aim is to determine the platform's business model, its characteristics and the impact of these characteristics on public interest, while in the second path possible interventions are explored, along with their consequences. The starting point is the policy question, that means the potential anti-competitive behavior of the platform: this approach could avoid spending time in analyzing the digital platform in all its angles in order to focus on the relevant aspects. Then, the platform's type, business model and characteristics have to be analyzed: in this phase stakeholders and the platform itself could be involved. Studying the platform's business model, as we already pointed out, is the most important step, after which the main relevant characteristics that concern the policy question should be listed. After this, possible interventions and its potential outcomes should be outlined, with different "what if" scenarios, assumptions and estimations. In this phase, it should be studied also the effect that these interventions could have on the platform's characteristics and what could be the platform's reaction: also in this step the platform itself could be involved, as well as its stakeholders. This process gives a complete overall view, suits with the dynamic nature of digital platforms and contrasts with the current regulatory approach that is meant for static situations.

Anyway, in adapting the competition regulation for online platforms, two elements should be preserved: the **integrity of EU regulation** and the **trust in Antitrust authorities**. The first refers to the tendency of European countries to act individually, establishing rules and requirements for online platforms inside the national boundaries. Although it is remarkable for the single government to be concerned for platforms' regulation, this leads to regulatory fragmentation and make it more difficult for potential innovators to enter in the market. The second element underlines the necessity to gain the trust of consumers and businesses that operates within the platforms, proving that EU authorities are able to protect their privacy and their right in a market dominated by digital economy. In particular, giving the two or multi-sided market in which they operate, consumers are not the only ones that need protection: businesses that enter into agreements with them, almost forced to do it because they couldn't be profitable without them, are always victims of exploitation of bargaining power by the platforms. "*Businesses operating as sellers of goods or suppliers of services for example have an inadequate level of protection against arbitrary de-listing by large platforms, with only complicated and costly options for filing redress requests*" [75]. They often have to accept conditions not very favorable for them to operate in the platform, having no other option. We greatly explained this problem whit the Amazon's example (see section 5.4). This kind of behavior should be taken more into account in competition regulation.

6.2.2.2 Applying the proposed framework to Facebook

Nooren et Al [80] complete their study by applying their proposed framework to one of the GAFA companies, Facebook. Since the aim is to give an overall picture of the use of the framework, no policy issue is investigated and no policy interventions are proposed: in that case, the analysis should be deeper. The only intervention investigated as an example is data portability, that has been approved under the new GDPR regulation.

1. *Digital platform type and characteristics*: Facebook is a Social Network platform, its revenue model is based on **advertising**; advertising accounts for 98% of Facebook's revenues. The **direct network effects** are very strong, since Facebook becomes more valuable to users as the number of users with which they can interact increases. The direct

network effects promote scale and innovation; at the same time they have the consequence of raising entry barriers for new entrants, that have to compete with an already affirmed social network that counts with a large user base, making it difficult for consumers to switch to another platform, since they shared their data on Facebook and established a large friends network there. For this reason, even if multi-homing is possible and common, what counts is the actual utilization of the social network platform, aspect in which Facebook prevails substantially. The **indirect network effects** are also strong, since the value for advertisers grows with the number of active users. As the direct ones, also the indirect network effects raise barriers of entry for other platforms, that couldn't offer to advertisers the number of users Facebook has. Facebook has a moderate degree of **horizontal integration**, offering additional products to its social network platform, like a messaging feature (Messenger) or an e-commerce feature (Marketplace), all tied to its main platform. As for the **vertical integration,** Facebook moved into devices and operates an extended data center infrastructure. Facebook's most valuable assets is **data and content** generated directly by users: Facebook uses data internally to improve the service it offers to users, and at the same time externally providing targeted advertising: advertisers can discriminate users by location, age, interests, and so on.

2. *Impact of characteristics on public interests*: Facebook's strong network effects have an impact on **competition** and **innovation**, as we explained. Moreover, another factor that has an impact on competition is that Facebook is used by other platforms in many ways: game providers rely on Facebook's platform to distribute their games, Facebook's login is utilized by the majority of platforms to make it easier for users to sign up and many websites utilizes Facebook's like and comment features. This demonstrates how Facebook has become an important channel for many companies and websites. Facebooks' use of data and content have an impact on users' **privacy and data protection.**

3. *Impact of possible interventions on characteristics*: The introduction of **data portability** doesn't affect the size of network effects, but makes them less effective since users can move more easily to another platform. Moreover, it affects Facebook's internal use of data and content, reducing the platform's incentive to innovate in internal use of new data since this has to be portable and, consequently, shared with others. Portability can also increase external use of data, but by the consumer, and it could lead to discrepancies in data sets in parallel social networks. From the users' privacy and data protection perspective, this intervention provides users more control over their personal data. From the competition perspective, it lowers switching costs that users would incur in when moving to another platform, decreasing entry barriers for competitors: in this way, competition for the market could become competition in the market.

Applying the framework considering different interventions could help the authorities understand better the impact that these could have on the market. Clearly, assumptions should be made, but it could give a useful overall view. Anyway, as we often underlined, the most important aspect is the analysis of the digital platform's business model and its characteristics, since every platform is different, and this is the starting point for every investigation.

6.2.3 Tax regulation

Generally, under the current tax regulation, firms' profits are taxed only by the state of residence or eventually in other countries where the firm has a permanent establishment. The definition of permanent establishment "*requires a certain level of physical presence of the foreign enterprise in the taxing jurisdiction, either through a 'fixed place of business' or through the actions of a 'dependent agent'* ". This means that if there is an economic activity like distribution, local marketing or inventory the threshold is met, while "*the mere export of goods by a foreign enterprise that are not produced or distributed through a local facility would not be covered by this definition."* [77] After determining the existence of a permanent establishment, the percentage of profits to be taxed depend from profit allocation rules. Digital platforms have been able to avoid taxation through complicated tax systems (we explained how Apple and Amazon did this), as other non-digital multinational have also done, but in addition they have the advantage of having no material resources, since their assets are intangible and their activity in a country doesn't necessarily involve any sort of physical presence.

This implicates a need of adapting the actual tax regulation framework based on the two elements of permanent establishment and profit allocation to online platforms, but there are different views among countries members of the Inclusive Framework on BEPS. The Inclusive Framework on BEPS was established by OECD (Organisation for Economic Co-operation and Development) in June 2016 with the purpose of bringing together all countries willing to collaborate in monitoring and updating tax planning strategies, gap and mismatches in tax regulation; also non-G20 countries can join the Inclusive Framework and already over than 115 countries have taken part to it. There are mainly three different views of how the tax system should be modified for digital platforms. The first group of countries is convinced that the characteristics of digital platforms have the consequence of misalignment between the location where the profits are taxed and the one where the value is created: this misalignment is "*the result of a new and unique feature observed in some highly digitalised business models that is not captured by the existing international tax framework: the active participation of users through an online platform, and the value that this participation creates for the business (i.e., **user-generated value**)*". [77] Since this feature is not captured by the actual tax regulatory framework, it is obvious that it should be modified with changes targeting online platforms' business models. Anyway, in order to capture user-generated value, the first group of countries doesn't think it is necessary to completely change the tax framework and it keeps traditionally convinced that "*profits should continue to be taxed exclusively where the factors that produce the income are located, in accordance with long-standing principles of the existing tax system*." [77] For the second group of countries, instead, the changes that should be made on the tax framework are wider and deeper: they think that digitalization is deeply changing the world and the way companies make business, with the result that the definition of taxable presence takes another meaning. According to them, both the traditional tax rules are not applicable to digital platforms and should drastically be changed: digital platforms don't need a permanent establishment in a country to have economic activities there, and their profits depend on non-physical and intangible value, that makes them more difficult to allocate and be taxed. Finally, the third group of countries is satisfied with the actual tax framework and doesn't think there is any need for changes. The Inclusive Framework will anyway reach a common decision by 2020.

A temporary solution could be found while working on a common long-term solution, for which lot of time is necessary. The Commission made two proposals in March 2018 in this direction:

- Reforming tax rules with a long-term solution that taxes digital platforms where the value is created, that means where they have a strong digital presence and not a permanent establishment;
- An interim tax for digital activities, that should be temporary, targeted and should also minimize over-taxation, costs and complexity;

The first proposal aims to allow member states to tax a digital platform even if it doesn't have a physical presence in that country. As specified on the European Commission website, "*a digital platform will be deemed to have a taxable 'digital presence' or a virtual permanent establishment in a Member State if it fulfils* ***one*** *of the following criteria:*

- *It exceeds a threshold of €7 million in annual revenues in a Member State*
- *It has more than 100,000 users in a Member State in a taxable year*
- *Over 3000 business contracts for digital services are created between the company and business users in a taxable year."* [78]

This new tax rule would solve the permanent establishment problem and it would also affect the profit allocation rules, for example profits could be taxed depending on where the user is located when he utilizes a platform's service. The attribution of profits should consider the user-generated value we introduced before.

The second proposal would be more immediate and aims to make up for the profits that are not taxed at the moment but should be, and could avoid fragmentation: in fact, without a fast even if temporary solution, the single EU countries could start acting by themselves, compromising the unity of the Single Market. This tax would be applied to revenues generated by digital activities that imply great user-generated value, "*such as those revenues:*

- *created from selling online advertising space*
- *created from digital intermediary activities which allow users to interact with other users and which can facilitate the sale of goods and services between them*
- *created from the sale of data generated from user-provided information.*

Tax revenues would be collected by the Member States where the users are located and will only apply to companies with total annual worldwide revenues of €750 million and EU revenues of €50 million" [78] This last threshold aims to protect those start-ups that are still small and growing. The proposed rate is **3% of revenues** that come from the three kinds of digital activities specified before, that is expecting to generate for Member States 5 billion euros per year.

6.2.4 Data protection and privacy regulation

Data has a very important role in establishing market dominance in the digital economy environment. The major online platforms benefit from owning substantial datasets, that contribute

to lock-in consumers, that are less incline to multi-home because of the high switching costs of losing their data. The new **GDPR** regulation, that took effect in May 2018, has the purpose to improve users' data protection. The introduction of **data portability**, that allows users to transfer their data from one platform to another, is expected to increase the possibility to multi-home and to decrease the lock-in effect that often occurs with online platforms. However, it is difficult that data portability will be soon implemented by digital platforms, unless the Commission defines better how it should be applied for each type of platform; the guidelines "*should match data portability requirements to different types of online platform, adopting a proportionate approach depending on the essentiality of the service in question".* [40]

Concerns about lack of transparency lead some to propose the disclosure of online platforms' algorithms; anyway, this solution is not considered efficient, since it would compromise platforms' own intellectual property; moreover, these algorithm are updated continuously, so it would be difficult for platforms to send the last versions to authorities every time a change is made. The alternative is to require platforms to be more transparent, clearly explaining the basis upon which, for example, they rank search results or display an advertisement: in general, on online platforms' websites it should be more clear their relationship with their suppliers and their business models, and they should inform explicitly consumers if they engage in personalized pricing or other similar practices.

A proposed solution to overcome the online platforms' dominance is to weaken their data possession by the introduction of **interoperability**: this would allow "*users to communicate from Facebook to Telegram directly, would certainly reduce lock-in effects and allow competitors to integrate their services more swiftly with other platform services*". [75] In fact, the lack of interoperability between different platforms has the consequence that users are likely to join the largest platform and this is the main factor that contributes to market concentration. It favors lock-in in every side of the market and constitutes a barrier of entry.

6.3 Players involved

In order to find a resolution and adapt to the new digital economy, Matz et al [79] explain that there are different 'players' involved, that should do their part to contribute. The players are listed in order of relevance and a table of advantages and disadvantages is provided for each player.

6.3.1 Government

Governments have the power to regulate digital platforms. For that, two different approaches should be discussed: if the government should consider major digital platforms like natural monopolies/oligopolies, limiting their power, or if the government should govern them by encouraging competition with the support of antitrust authorities and rules.

6.3.1.1 Regulating dominant platforms as natural monopolies

Khan explains this solution, that implies the **public utility** regulation and "*aims at eliminating competition: it accepts the benefits of monopoly and chooses instead to limit how a monopoly may use its power*." [21] Various industries have been considered natural monopolies, like the transport industry, commodities (water, electric power, gas, ...) and communications. Nowadays this is not a

very popular solution but in the last century it was widely utilized: the reason was that these industries were essential for consumers and, if left unregulated and private, would lead to monopoly power. There are three most common public utilities policies: *"(1) requiring nondiscrimination in price and service, (2) setting limits on rate-setting, and (3) imposing capitalization and investment requirements.*" For a digital platform it could be difficult to apply (2) and (3), but it should be given consideration to (1). In fact, by imposing non-discrimination to digital platforms, they couldn't favor their products over those of competitors' neither discriminate among consumers (personalized prices) or use leveraging strategies over producers. This could be done for example, like it has been done already in the past, by breaking a major dominant platform in different entities; a lighter solution could also be found. Khan supposes to apply this solution to Amazon, giving as example two different approaches: "*One approach would apply public utility regulations to all of Amazon's businesses that serve other businesses. Another would require breaking up parts of Amazon and applying nondiscrimination principles separately; so, for example, to Amazon Marketplace and Amazon Web Services as distinct entities. That said, given the political challenges of ushering in such a regime, strengthening and reinforcing traditional antitrust principles may-in the short run-prove most feasible.*" [21]

Another light version of public utility that could be taken into account is the concept of **essential facility,** that "*rests on two basic premises: first, a natural monopolist in one market should not be permitted to deny access to the critical facility to foreclose rivals in adjacent markets; second, the more radical remedy of dividing the facility among multiple owners, while mitigating the threat of monopoly leveraging, could sacrifice important efficiencies. A facility is essential and must be shared if four conditions are met: (1) a monopolist controls the essential facility; (2) a competitor is unable practically or reasonably to duplicate the essential facility; (3) the monopolist is denying use of the facility to a competitor; and (4) providing the facility is feasible".* Khan [21] takes another time as example of dominant digital platform Amazon, affirming that is easy to prove that the company satisfies the requirements (2), (3) and (4) at least in one line of business. The monopolist requirement could not meet the requirement (1) if the definition of monopolist is too strict, but Amazon controls the key infrastructure of e-commerce and "*we can imagine at least three aspects of its business could eventually raise "essential facilities"-like concerns: (1) its fulfillment services in physical delivery; (2) its Marketplace platform; and (3) Amazon Web Services*".

The solution could allow to maintain the benefits of scale and at the same time limiting the power of digital platforms. Anyway, this solution, even if it is being explored, is not likely to be implemented: many think that monopolies are temporary in the dynamic digitalized world and, apart from this, in the last years natural monopolies were criticized "*as a form of corruption, a system in which private industry executives colluded with public officials to enable rent seeking*".

6.3.1.2 Regulating dominant platforms with antitrust rules

Governments could increase support in antitrust authorities, contributing to resources, funding, expertise they need to accelerate and improve the process of regulating digital entities.

Table 6.1 Advantages and disadvantages of government taking a role in regulating platforms. [79]

Advantages	Disadvantages
Prior examples of government pressure targeting companies like AT&T, Microsoft, IBM have worked and brought innovation.	Digital monopolies bring a lot of money to the economy and "breaking" them may seem as self-flagellating of "national treasures".
Government is the highest authority that can encourage competition and distribute power	Digital platforms that should be regulated have stronghold on governments.
	Governments are often inefficient and slow.
	The data collected by digital monopolies is also used by governments for national security purposes.
	Government intervention can be political.

6.3.2 Media

Traditional media, like TV and radio, has an important role in promoting the public debate about digital platforms' regulation issues, in raising awareness of the problem by exposing the risks they pose to competition, users' privacy and so on. It is also true, however, that some digital platforms are turning into the masters and gaining ample control over "new (internet-based) media".

Table 6.2 Advantages and disadvantages of media taking a role in regulating platforms. [79]

Advantages	Disadvantages
It is an opportunity for traditional media to strengthen the power and influence that they are losing to digital platforms.	Digital monopolies effectively control media distribution nowadays and the current media channel use them for information distribution.
Media's distribution of information is fast and reach a great audience almost in real-time.	Concerted campaigns against digital platforms could compromise population's trust in media, as it may be perceived as self-serving due to financial competition media have with them.
Traditional media are still a reliable source of information.	

6.3.3 Academics

Academics can propose and develop solutions to threats posed by digital monopolies, through objective researches. The approach should be multi-disciplinary, as digital economy affects our lives in many aspects, with expertise from areas as computer science, economy, psychology, sociology, political science and so on.

Table 6.3 Advantages and disadvantages of academics taking a role in regulating platforms. [79]

Advantages	Disadvantages
Academic research is mostly impartial and aims to generate objective knowledge and truth.	Academic research is slow.
Many of the seniors employers in digital monopolies are former academics, so they can more easily talk about the issue because of their direct experience.	Academics' resources are limited (little access to data, power, money, ...) respect to industry leaders.
	Since research is increasingly funded by industry leaders, new solutions provided by academics could be partial.

6.3.4 Users

Use of digital platforms is voluntary, no one forces users to spend their day on Facebook sharing their lives. A large part of responsibility lies in users, that should be more aware of how their data is utilized and start taking some measures.

1. *Requesting a report of the personal data businesses hold*
2. *Implementing parental control features to regulate kids' social media usage*
3. *Checking the veracity of information using more than one news source*
4. *Updating privacy settings and restricting a company's access and usage of one's data*
5. *Engaging in public civil response (e.g., demonstrations, voting) to resist monopolization.*

As a rule of thumb users should realize that, "If you're not paying for it, you are the product being sold to someone else." [79]

Table 6.4 Advantages and disadvantages of users taking a role in regulating platforms. [79]

Advantages	Disadvantages
As the "product" being commoditized, users have the ultimate power over digital monopolies.	People don't always act in their best interest and tend to favor short-term benefits to long-term interests.
Users are the ones most affected by current practices of major digital platforms, so they should have a say more than anyone.	Users might not be aware of what is happening behind the scene of digital monopolies and most of them are not concerned at all.

6.3.5 Other corporate giants

It is in the interest of other corporate giants to work towards solutions to mitigate the power of digital monopolies. In fact, the monopolization of data gives to them an unprecedent advantage in various industries: even in those business where digital monopolies are not competing, it would be easy for them to enter and assume a dominant position given their scale and their dynamic nature.

For example, Matz and al [79] outlines how "*smartphone manufacturers could play a special role in standing up to the digital monopolies since they act both as competitors and as enablers of the platforms*", since even if they could seem belonging to the same business category of some major online platforms, their business model is different since their revenues comes from the amount of products sold. They could actively do something, for example "*they can provide consumers with better tools to protect themselves from misuse of data on digital platforms, or from excessive/addictive usage*".

Table 6.5 Advantages and disadvantages of other corporate giants taking a role in regulating platforms. [79]

Advantages	Disadvantages
Large corporations have interest in doing something about it since digital platforms pose threats on them too.	Requires spending money in the present for potential future benefits.
They have considerable resources (financial, networks) that can be deployed almost instantaneously.	Risk of the "tragedy of commons", where other giants competing with them could take the benefits of partnering with digital monopolies to eliminate them as rivals.
They can act as role models to demonstrate the value of data transparency to consumers.	

6.3.6 Digital monopolies themselves

While it seems reasonable that digital monopolies prefer to maintain the status quo, some argue that "*it is in fact in their own self-interest to become more transparent and to provide open access to their data, while keeping the analytics algorithms as their intellectual property alone".* Since they worked, from the beginning, with mottos like "don't be evil" (Google), "connect the world" (Facebook) and so on, returning on this line proving more transparency and giving more control to users would increase the public usage and trust in their services, at the same time avoiding being imposed other extreme solutions.

Table 6.6 Advantages and disadvantages of digital platforms taking a role in regulating themselves. [79]

Advantages	Disadvantages
The public hostility towards them would decrease.	No one likes to give up power.
Better to have self-regulation than a potential alternative that will likely be presented, which is authorities takeover.	The uncertainty about how such changes would impact the competitiveness and success of them in the long run.
	Short-term financial losses.
	Potential long-term financial losses and risk of losing out to competitors that do not adhere to such standards.

Bibliography

[1] Evans, David S., *Two-Sided Market Definition* (November 11, 2009). ABA Section of Antitrust Law, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, Forthcoming. Available at: https://ssrn.com/abstract=1396751 [Accessed 10 Feb. 2019]

[2] Parker, Geoffrey and Van Alstyne, Marshall W., *Two-Sided Network Effects: A Theory of Information Product Design* (September 29, 2010). Management Science, Vol, 51, No. 10, pp. 1494–1504, 2005. Available at: https://ssrn.com/abstract=1177443 [Accessed 10 Feb. 2019]

[3] European Commission, 2016, *Study on future trends and business models in communication services.* Available at: https://publications.europa.eu/en/publication-detail/-/publication/ecf0bfc2-9aa9-11e6-868c-01aa75ed71a1 [Accessed 10 Feb. 2019]

[4] Batura, Olga & van Gorp, Nicolai. (2016). Challenges for Competition Policy in a Digitalised Economy. Available at: http://www.europarl.europa.eu/studies [Accessed 10 Feb. 2019]

[5] Sokol, D. Daniel and Comerford, Roisin E., Antitrust and Regulating Big Data (September 4, 2016). 23 George Mason Law Review 119 (2016) ; University of Florida Levin College of Law Research Paper No. 16-40. Available at: https://ssrn.com/abstract=2834611 [Accessed 10 Feb. 2019]

[6] Coyle, D., 2018, *Practical competition policy implications of digital platforms.* Bennet institute for public policy. Available at: https://www.bennettinstitute.cam.ac.uk/events/practical-competition-policy-implications-digital-/ [Accessed 10 Feb. 2019]

[7] Frieden, Rob, *The Internet of Platforms and Two-Sided Markets: Legal and Regulatory Implications for Competition and Consumers* (October 2017). Available at: https://ssrn.com/abstract=3051766 [Accessed 10 Feb. 2019]

[8] Financial Times FT Global 500, *Market value and prices at September 2008*. Available at: http://media.ft.com/cms/eee5847a-9085-11dd-8abb-0000779fd18c.pdf [Accessed 10 Feb. 2019]

[9] Market cap www.macrotrends.net. Available at: https://www.macrotrends.net [Accessed 10 Feb. 2019]

[10] OECD (2018) *Rethinking Antitrust Tools for Multi-Sided Platforms.* Avalaible at: www.oecd.org/competition/rethinking-antitrust-tools-for-multi-sided-platforms.htm [Accessed 10 Feb. 2019]

[11] Companies financial data. Avalaible at: https://it.investing.com [Accessed 10 Feb. 2019]

[12] Stone, B., 2014. *The everything store. Jeff Bezos and the age of Amazon.* New York: Little, Brown & Company.

[13] Haro, J. L. d., 2014. *Amazon: un nuevo modelo de negocio a golpe de clic.* s.l., CONECTA.

[14] *History of Amazon.com, Inc. – FundingUniverse*. Fundinguniverse.com. Available at: http://www.fundinguniverse.com/company-histories/amazon-com-inc-history/ [Accessed 10 Feb. 2019]

[15] Hansell, S., 1998. Amazon.com Is Expanding Beyond Books. *New York Times*. Available at: https://www.nytimes.com/1998/08/05/business/amazoncom-is-expanding-beyond-books.html [Accessed 10 Feb. 2019]

[16] Russo, R., 2011. Amazon's Jungle Logic. *New York Times.* [online] Available at: https://www.nytimes.com/2011/12/13/opinion/amazons-jungle-logic.html [Accessed 10 Feb. 2019]

[17] Reisinger, D., 2016. Watch Amazon's Prime Air Complete Its First Drone Delivery. *Fortune*. [online] Available at: http://fortune.com/2016/12/14/amazon-prime-air-delivery/ [Accessed 10 Feb. 2019]

[18] Galloway, S., 2017. *The four: The hidden DNA of Amazon, Apple, Facebook, and Google.* New York: Penguin Books.

[19] Wingfield, N., 2017. Amazon to Buy Whole Foods for $13.4 Billion. *New York Times.* [online] Available at: https://www.nytimes.com/2017/06/16/business/dealbook/amazon-whole-foods.html [Accessed 10 Feb. 2019]

[20] Day, M., 2018. Amazon Go cashierless convenience store opens to the public in Seattle, *Seattle Times*. [online] Available at: https://www.seattletimes.com/business/amazon/amazon-go-cashierless-convenience-store-opening-to-the-public/ [Accessed 10 Feb. 2019]

[21] Khan, L., 2017. *Amazon's Antitrust Paradox.* Yale Law Journal, Vol. 126, 2017. Available at: https://ssrn.com/abstract=2911742 [Accessed 10 Feb. 2019]

[22] Statista.com charts, Available at: https://www.statista.com [Accessed 10 Feb. 2019]

[23] Available at: https://www.valuewalk.com/2017/05/tech-giants-google-apple-facebook-amazon-microsoft/ [Accessed 10 Feb. 2019]

[24] History of Apple Inc. – *FundingUniverse*. [online] Fundinguniverse.com. Available at: http://www.fundinguniverse.com/company-histories/apple-computer-inc-history/ [Accessed 10 Feb. 2019]

[25] Yoffie, D., and Slind, M. Apple Inc., 2008. *Harvard Business School Case 708-480, February 2008*.

[26] Hughes, N., 2012. Customers Line Up for iPhone 5 Outside Apple's Fifth Ave Store. *AppleInsiders.* Available at: http://appleinsider.com/articles/12/09/17/customers_queue_up_for_iphone_5_outside_apples_fifth_ave_store [Accessed 10 Feb. 2019]

[27] Griggs, B., 2011. Steve Jobs, Apple founder, dies. *CNN.* Available at: https://edition.cnn.com/2011/10/05/us/obit-steve-jobs/index.html [Accessed 10 Feb. 2019]

[28] Grewal, S., 2018. **S**even years later: Apple after Steve Jobs. *Queens Journal.* Available at: https://www.queensjournal.ca/story/2018-01-18/lifestyle/seven-years-later-apple-after-steve-jobs/ [Accessed 1 Oct. 2018]

[29] Montgomerie, J. and Roscoe, S., 2013. *Owning the consumer - Getting to the core of the Apple business model*, Accounting Forum, Volume 37, Issue 4, Pages 290-299. Available at: https://doi.org/10.1016/j.accfor.2013.06.003.

[30] *History of Facebook Inc. – FundingUniverse*. [online] Fundinguniverse.com. Available at: http://www.fundinguniverse.com/company-histories/facebook-inc-history/ [Accessed 1 Oct. 2018]

[31] *Number of monthly active Facebook users worldwide as of 2nd quarter 2018 (in millions) – Statista.com,* July 2018. [online] Available at: https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/ [Accessed 1 Oct. 2018]

[32] Kirkpatrick, D. and Vidal, M., 2011. *El efecto facebook*. Barcelona: Grupo Planeta.

[33] *History of Facebook – brandwatch.* Available at: https://www.brandwatch.com/blog/history-of-facebook/ [Accessed 1 Oct. 2018]

[34] Google Inc. *Wikipedia.* Available at: https://en.wikipedia.org/wiki/Google#Alphabet [Accessed 3 Oct. 2018]

[35] Vise, D. and Malseed, M., 2006. *La historia de Google*. Madrid: La esfera de los libros.

[36] Cadwalladr, C. and Graham-Harrison E., 2018. Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach. *The Guardian.* Available at: https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election [Accessed 10 Feb. 2019]

[37] Hautala, L., 2018. Facebook's new data policy: Answers to your privacy questions. *CNET.* [online] Available at: https://www.cnet.com/news/facebook-data-policy-answers-to-your-privacy-questions-cambridge-analytica/ [Accessed 10 Feb. 2019]

[38] Bernal, N., 2018. EU orders tech giants to step up war on fake news. *The Telegraph.* [online] Available at: https://www.telegraph.co.uk/technology/2018/09/26/eu-tells-tech-giants-ramp-war-against-fake-news/ [Accessed 10 Feb. 2019]

[39] Mandrescu, D., 2017, *Applying EU Competition Law to Online Platforms: The Road Ahead*. Available at SSRN: https://ssrn.com/abstract=3117840 [Accessed 10 Feb. 2019]

[40] Batura,O., Van Gorp, N., Prof. Pierre Larouche, 2015., *Online Platforms and the EU digital single market.*

[41] European Commission Competition. Google Search (Shopping). Case 39740. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39740 [Accessed 10 Feb. 2019]

[42] European Commission Competition. Google Android. Case 40099. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40099 [Accessed 10 Feb. 2019]

[43] Lockheimer, H., 2018, *Complying with the EC's Android decision.* Google in Europe. Available at: https://www.blog.google/around-the-globe/google-europe/complying-ecs-android-decision/ [Accessed 10 Feb. 2019]

[44]European Commission Competition. Google Search (AdSense). Case 40411. Available at http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40411 [Accessed 10 Feb. 2019]

[45] Vijayasarathy, S., 2017, *Google I/O 2017 By the Numbers: 2 Billion Android Devices, 500 Million Photos Users, and More.* Available at : https://gadgets.ndtv.com/apps/news/google-io-2017-android-drive-photos-users-youtube-maps-1695234 [Accessed 10 Feb. 2019]

[46] Open letter to Commissioner Vestager from 14 European CSSs, 22 November 2018, Available at: http://www.searchneutrality.org/google/comparison-shopping-services-open-letter-to-commissioner-vestager [Accessed 10 Feb. 2019]

[47] Toma, F., 2017, *The Challenges of Digital Markets for EU Competition Law: The Case of Android.* Available at SSRN: https://ssrn.com/abstract=3092823 [Accessed 10 Feb. 2019]

[48] European Commission Competition. State aid to Apple – Ireland. Case SA.38373. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_38373 [Accessed 10 Feb. 2019]

[49] European Commission Competition. Amazon e-books. Case 40153. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40153 [Accessed 10 Feb. 2019]

[50] European Commission Competition. State aid to Amazon – Luxembourg. Case SA.38944. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_38944 [Accessed 10 Feb. 2019]

[51] European Commission, 2017., *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL A Fair and Efficient Tax System in the European Union for the Digital Single Market.*

[52] European United Left/Nordic Green Left (EGUENGL), 2018, *Exposed: Apple's golden delicious tax deals.*

[53] Apple Annual Report 2017. Available at: https://investor.apple.com/investor-relations/sec-filings/ [Accessed 10 Feb. 2019]

[54] European Commission Competition. Merger procedure Facebook/WhatsApp. Case M.7217. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=2_M_7217 [Accessed 10 Feb. 2019]

[55] Ocello, E., 2015, *What's Up with Merger Control in the Digital Sector? Lessons from the Facebook/WhatsApp EU Merger Case*, COMPETITION MERGER BRIEF. Available at: http://ec.europa.eu/competition/publications/cmb/2015/cmb2015_001_en.pdf [Accessed 10 Feb. 2019]

[56] European Competition Network, *The French, Italian and Swedish Competition Authorities Accept the Commitments Offered by Booking.com* (1 July 2015): https://webgate.ec.europa.eu/multisite/ecn-brief/en/content/french-italian-and-swedish-competition-authorities-accept-commitments-offered-bookingcom [Accessed 10 Feb. 2019]

[57] European Commission Competition. Asus (vertical restraint) Case 40465. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40465 [Accessed 10 Feb. 2019]

[58] European Commission Competition. Denon & Marantz (vertical restraint) Case 40469. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40469 [Accessed 10 Feb. 2019]

[59] European Commission Competition. Philips (vertical restraint) Case 40181. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40181 [Accessed 10 Feb. 2019]

[60] European Commission Competition. Pioneer (vertical restraint) Case 40182. Available at: http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40182 [Accessed 10 Feb. 2019]

[61] Litjens, Lotte. *Most Favoured Nation clauses and online platforms: competitive effects and EU competition law.*

[62] Stucke, M., 2018, *Should we be concerned about dataopolies*? 2 GEO. L. TECH. REV. 275 Available at: https://ssrn.com/abstract=3144045 [Accessed 10 Feb. 2019]

[63] Bundeskartellamt press release. *Preliminary assessment in Facebook proceeding: Facebook's collection and use of data from third-party sources is abusive.* Available at : https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Pressemitteilungen/2017/19_12_2017_Facebook.html?nn=3600108 [Accessed 10 Feb. 2019]

[64] OECD, 2018, *Personalised Pricing in the Digital Era,* OECD Publishing, Paris. Available at: http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DAF/COMP(2018)13&docLanguage=En [Accessed 10 Feb. 2019]

[65] Mahdawi, A., 2018, *Is Your Friend Getting a Cheaper Uber Fare Than You Are?*, The Guardian, Available at: https://www.theguardian.com/commentisfree/2018/apr/13/uber-lyft-prices-personalized-data [Accessed 10 Feb. 2019]

[66] Soler, X. and Arnau, S., 2016, *THE DATA-DRIVEN ECONOMY. CHALLENGES FOR COMPETITION.*

[67] Abramson, A., 2018, *Google Spent Millions More Than its Rivals Lobbying Politicians Last Year*, TIME. Available at: http://time.com/5116226/google-lobbying-2017/ [Accessed 10 Feb. 2019]

[68] Rommi,T., 2018, *Apple, Amazon, Facebook and Google spent nearly $50 million — a record — to influence the U.S. government in 2017.* Recode. Available at: https://www.recode.net/2018/1/23/16919424/apple-amazon-facebook-google-uber-trump-white-house-lobbying-immigration-russia [Accessed 10 Feb. 2019]

[69] Steinbaum, R., 2018, *EVIDENCE AND ANALYSIS OF MONOPSONY POWER, INCLUDING BUT NOT LIMITED TO, IN LABOR MARKETS*, Public Comment to the Federal Trade Commission. Available at: https://www.ftc.gov/system/files/documents/public_comments/2018/08/ftc-2018-0054-d-0006-151013.pdf [Accessed 10 Feb. 2019]

[70] Newman, N., 2014, *Search, Antitrust, and the Economics of the Control of User Data*. Yale Journal on Regulation. Available at: https://digitalcommons.law.yale.edu/yjreg/vol31/iss2/5/ [Accessed 10 Feb. 2019]

[71] Faherty, E., Huang, K. and Land, R., 2017, *The Amazon Monopoly: Is Amazon's Private Label Business the Tipping Point?* Bentley University. Available at: https://mpra.ub.uni-muenchen.de/83672/ [Accessed 10 Feb. 2019]

[72] Angwin, J and Mattu,S., 2016, *Amazon Says It Puts Customers First. But Its Pricing Algorithm Doesn't*, PROPUBLICA. Available at : https://perma.cc/RR6C-FTS4 [Accessed 10 Feb. 2019]

[73] Ghosh, S., 2017, *Here's the letter Spotify's founders wrote to the EU complaining Apple and Google are abusive.* Business Insider. Available at: https://www.businessinsider.com/spotify-deezer-rocket-internet-letter-european-commission-2017-5?IR=T [Accessed 10 Feb. 2019]

[74] Kafka, P., 2016 *Spotify says Apple won't approve a new version of its app because it doesn't want competition for Apple Music***.** Recode. Available at : https://www.recode.net/2016/6/30/12067578/spotify-apple-app-store-rejection [Accessed 10 Feb. 2019]

[75] Affeldt, P., Filistrucchi, L. and Klein, T., 2013, *Upward Pricing Pressure in Two-Sided Markets.* Available at: https://onlinelibrary.wiley.com/doi/10.1111/ecoj.12050 [Accessed 10 Feb. 2019]

[76] Dittrich, P., 2018, *Online platforms and how to regulate them: an Eu overview.* Jacques Delors institut, Berlin. Available at: https://www.bertelsmann-stiftung.de/en/publications/publication/did/online-platforms-and-how-to-regulate-them-an-eu-overview/ [Accessed 10 Feb. 2019]

[77] Monopolkommission, 215, *Competition policy: The challenge of digital markets.* Available at: https://www.monopolkommission.de/index.php/en/press-releases/52-competition-policy-the-challenge-of-digital-markets [Accessed 10 Feb. 2019]

[78] OECD, 2018, *Tax Challenges Arising from Digitalisation –Interim Report 2018.* Available at: http://www.oecd.org/ctp/tax-challenges-arising-from-digitalisation-interim-report-9789264293083-en.htm [Accessed 10 Feb. 2019]

[79] European Commission - Press release, 21 March 2018, *Digital Taxation: Commission proposes new measures to ensure that all companies pay fair tax in the EU*. Available at: http://europa.eu/rapid/press-release_IP-18-2041_en.htm [Accessed 10 Feb. 2019]

[80] Matz, S., Rolnik, G. and Cerf, M., 2018, *Solutions to the Threats of Digital Monopolies.* Available at: https://promarket.org/solutions-threats-digital-monopolies/ [Accessed 10 Feb. 2019]

[81] Nooren, P., Van Gorp, N., Van Eijk, N. and O Fathaigh, R., 2018, *Should We Regulate Digital Platforms? A New Framework for Evaluating Policy Options*. Available at: https://onlinelibrary.wiley.com/doi/full/10.1002/poi3.177 [Accessed 10 Feb. 2019]