
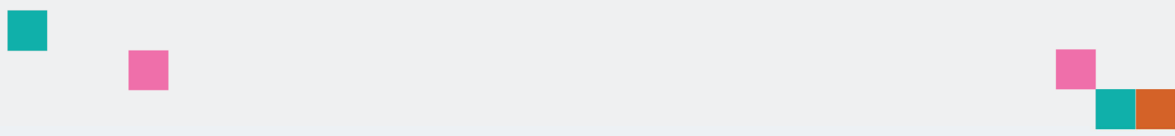




decode



**Economic and
regulatory analysis of
data platforms and
value creation models
of the on demand
economy**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 732546



Project no. 732546

DECODE

DEcentralised Citizens Owned Data Ecosystem

D2.2 Economic and regulatory analysis of data platforms and value creation models of the on demand economy

Version Number: V1.0

Lead beneficiary: CNRS

Due Date: December 2017

Author(s): Stefano Lucarelli (CNRS), Elena Musolino (CNRS), Giulia Rocchi (CNRS), Sophie Ciacciarelli (CNRS), David Laniado (Eurecat), Ricard Espelt (UOC), Enric Senabre (UOC), Mayo Fuster Morell (UOC), Francesca Bria (IMI)

Editors and reviewers: Marco Ciurcina (Polito), Eleonora Bassi (Polito), Tom Symons (NESTA)

Dissemination level:		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Approved by: Francesca Bria, Chief Technology and Digital Innovation Officer, Barcelona City Council (IMI)

Date: 30/12/2017

This report is currently awaiting approval from the EC and cannot be not considered to be a final version.

Contents

EXECUTIVE SUMMARY	5
1. BIG DATA IN THE DIGITAL ECONOMY	9
1.1 Defining Big Data: an open issue	9
1.2 Current and expected global industry trends	17
2. BIG DATA AND PRIVACY	19
2.1 The main differences between the EU and the US with regard to privacy protection	19
2.2 The key innovations introduced by the General Data Protection Regulation	20
2.3 The uncertain impact of the GDPR: optimistic, sceptical and dramatic previsions	23
2.4 The major obstacles to the expansion of European data-driven businesses. Some mainstream views	25
2.5 Towards an alternative framework: stressing the role of the little-known data broker industry	28
3. DATA-DRIVEN PLATFORMS AND COMPETITION	32
3.1 The peculiarity of data as a good	32
3.2 The structure of the big data market: challenges in defining potential competition issues	33
3.3 Is there a link between privacy and competition?	38
3.4 Why Big Data is susceptible to raise competitive concerns	39
3.5 Two/multi-sided markets/platforms: a literature review	41
4. DATA-DRIVEN VALUE CREATION MODELS: SELECTED INCUMBENT PLATFORMS' CASE STUDIES	47
4.1 Incumbent platform companies: a global economic and geographical overview	47
4.2 Internet search services: the case of Google Search	53
4.2.1 General description	54
4.2.2 Google Search's business model	57
4.2.3 Value creation model: a simplified framework	60
4.2.4 Risks connected to the current value creation model	61
4.2.5 Alternative approaches	73
4.3 Social media: the case of Facebook	75

4.3.1 General description	75
4.3.2 Facebook's business model	80
4.3.3 Value creation model: a simplified framework	84
4.3.4 Risks connected to the current value creation model	85
4.3.5 Alternative approaches	95
4.4 On-demand platforms: the case of Uber	98
4.4.1 General description	100
4.4.2 Uber's business model	103
4.4.3 Value creation model: a simplified framework	104
4.4.4 Risks connected to the current value creation model	105
4.4.5 Alternative approaches	119
4.5 On-demand platforms (bis): the case of Airbnb	120
4.5.1 General Description	120
4.5.2 Airbnb's business model	122
4.5.3 Value creation model: a simplified framework	125
4.5.4 Risks connected to the current value creation model	129
4.5.5 Alternative approaches	134
CONCLUSIONS	135
REFERENCES	137

Executive Summary

Author: Stefano Lucarelli and Francesca Bria

DECODE – DEcentralised Citizens Owned Data Ecosystem – aims to develop practical tools to protect people’s data and digital sovereignty.

The project is building towards a data-centric digital economy where citizen data, generated by the Internet of Things (IoT) and sensor networks, is available for broader communal use, with appropriate privacy protections. As a result, companies, cooperatives, local communities and citizens will be able to use that data to build data-driven services that better respond to individual and community needs. This means rethinking the thorny questions around the ownership, control and management of personal data from an economic, legal, regulatory and technical dimension¹.

The DECODE deliverable “*Economic and regulatory analysis of data platforms and value creation models of the on demand economy*” presents two main aims: (i) Proposing an analysis of regulatory models for data platforms; (ii) Clarifying the logic of value creation that characterises the so-called on-demand economy, by analysing four case studies of dominant platforms.

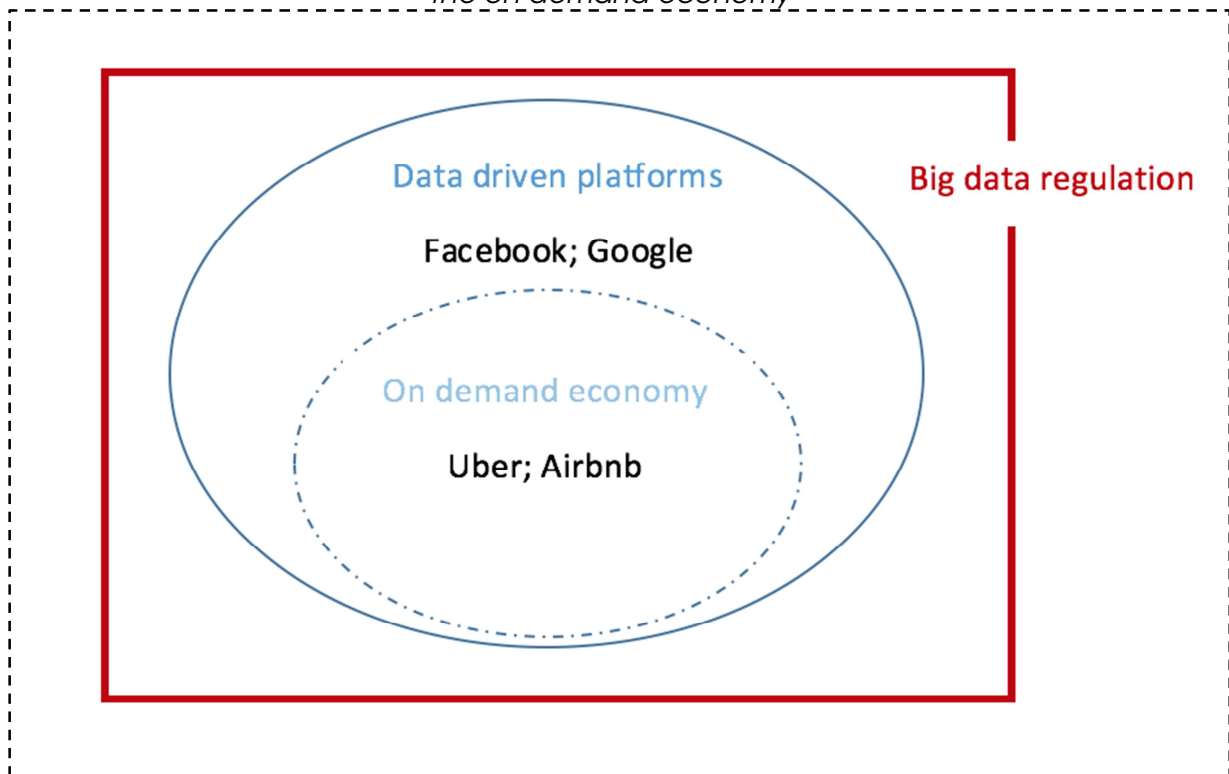
Both the objectives are necessary to develop T2.2 (“*Data-driven disruptive and commons based economic models*”) within the WP2 (“*Decentralised Governance and Economic framework: Commons data platforms for digital sovereignty*”). This deliverable analyses the dominant data-driven economic models, and clarifies the boundaries between the major data driven platforms and the so called on-demand platform economy, then it defines the different areas affected by currently existing regulatory models.

This analytical work is essential to be able to by propose in our future work economic, regulatory, and technical alternatives to the dominant, centralised and monopolistic economic models of data-driven platforms, *which exploit network effects and capture rent from network externalities*, thus hindering innovation and eroding citizens’ digital sovereignty (D 2.4).

This will contribute to the overall objective of DECODE to identify and experiment new political, economic, and legal regimes that recognize social and communal rights to data. A conceptual map of the different models of the data-driven economy can be represented as follows:

¹ Reclaiming Europe’s digital sovereignty: <https://www.ft.com/video/da525a75-0276-4261-a6fe-d5a4a950f157>

D2.2 "Economic and regulatory analysis of data platforms and value creation models of the on demand economy"



What kind of regulation?

What kind of new collective production models & alternative ownership regime for data?

Can we regulate data driven platforms to promote a transition towards alternative approaches of collective production models for a wealth that is equally distributed?

Can Europe develop alternatives?

D. 2.4 "Data driven disruptive commons-based models"

Both data-driven platforms and the on-demand economy are areas characterized by incisively innovative dynamics. Regulatory interventions in these fields, characterised by continuous evolution, are constantly confronted with the difficulty of defining the actual extent of regulation itself. In fact, what can happen is that innovative dynamics create business models that fall outside of existing applicable norms.

Consequently, the first section of this deliverable tries to contribute to a definition of 'Big Data', in the conviction that data extraction and management represents the driving force of value creation models within platform capitalism. Understanding the value of data and the emergence of big data management is key to defining the regulatory models necessary to favour the development of *alternative approaches of data-driven collective production where wealth is equally distributed, data is treated as a common good and not as a commodity, and citizens can regain data sovereignty*.

In the first part we provide a pragmatic definition of Big Data, looking at the evolution of its frequency in Web search queries, shows the main groups of concepts and actors around it, and highlighting the relevance of key players and powers like Google and Facebook.

The second section focuses on one of the most debated topics in data regulation: privacy and data protection. In particular, the main differences between EU and USA about privacy protection are presented and discussed, emphasising the opportunities for Europe with the new General Data Protection Regulation to propose new data-driven models that are privacy enhancing and rights respecting.

Attention is then paid to data marketplaces and the role played by data brokers, which remains still underinvestigated and opaque (which will then be recalled in the discussion related to Google's and Facebook's data extractivist value creation models). Finally, we maintain that the optimal trade-off between the need for innovation and the need for personal data protection and data sovereignty has not yet been achieved. To address this gap, and develop privacy-enhancing tools that allow people to regain control over their data is one of the main objectives of the DECODE project.

The third section is focused on another basic aspect for regulatory models: platform competition in data-driven markets, we question, among other things, the relationship between citizens' privacy and fair competition in data marketplaces. The economic literature has shown that the two-sided nature of platforms dealing with Big Data makes price a secondary factor among the determinants of the dynamics between the different sides of the platform. It is extremely significant that research tends to signal the relevance of a concept known as Small but Significant Non-transitory Decline in Quality. This aspect deserves attention in future DECODE research, especially within the upcoming phases related to project's pilots. It is also significant that the reviewed literature tends not to consider the specificities of the logics of value creation that characterize the concrete economic realities dominating platform capitalism.

Following this line of thought, in the fourth and last section we will present four case studies, which may be considered as benchmarks respectively in the context of integrated platforms (Google search and Facebook) and transaction platforms (Uber and AirBnB). Each section will describe their business model and value creation model, where those of Google and Facebook significantly diverge compared to Uber and AirBnB. This part of the deliverable aims to highlight some concrete problems that tends not to be adequately considered in the economic literature on regulatory models referring to data platforms.

On the whole, two emerging risks can be stressed: (i) The impact and negative effects of digital platform monopolies on competition in digital and non-digital data-related markets; (ii) The risks regarding citizens' data protection, privacy and data sovereignty.

Finally, we outline for each case study possible alternative models based on existing European experiences, also taking into account the results presented in D2.1 ("Multidisciplinary Framework on Commons Collaborative Economy). The overall ambition of the project is to reinforce the need for Europe to develop alternative models that preserve citizens digital sovereignty, where data is a common good owned by citizens and wealth created by data-driven platforms is equally distributed². These aspects of the research will be examined in more detail in the next deliverable D. 2.4 "Data driven disruptive commons-based models".

² Bria, F. (2017) Public policies for digital sovereignty. In Ours to Hack and to Own. The rise of platform cooperativism, a new vision for the future of work and a fairer internet. Available at https://www.academia.edu/19102224/Public_policies_for_digital_sovereignty

1. BIG DATA IN THE DIGITAL ECONOMY

1.1 Defining Big Data: an open issue

Author(s): David Laniado and Stefano Lucarelli

This section aims to contribute to a definition of ‘Big Data’, in the conviction that data management represents the driving force of value creation models within platform capitalism.

The term Big Data has been used since the 1990s, however its popularity has grown enormously since 2011, and got to its auge since 2014, as it can be observed looking at the evolution of its frequency in Web search queries (Fig. 1.1), as a proxy for the attention around it. The popularity of the term as “a trending buzzword in both academia and the industry” and the broadness of its usage and applications make its meaning “still shrouded by much conceptual vagueness” (De Mauro, Greco & Grimaldi, 2015). Therefore, before trying to provide a general definition of the term based on existing literature, we start with a kind of recursive definition, using somehow a Big Data approach to define Big Data.

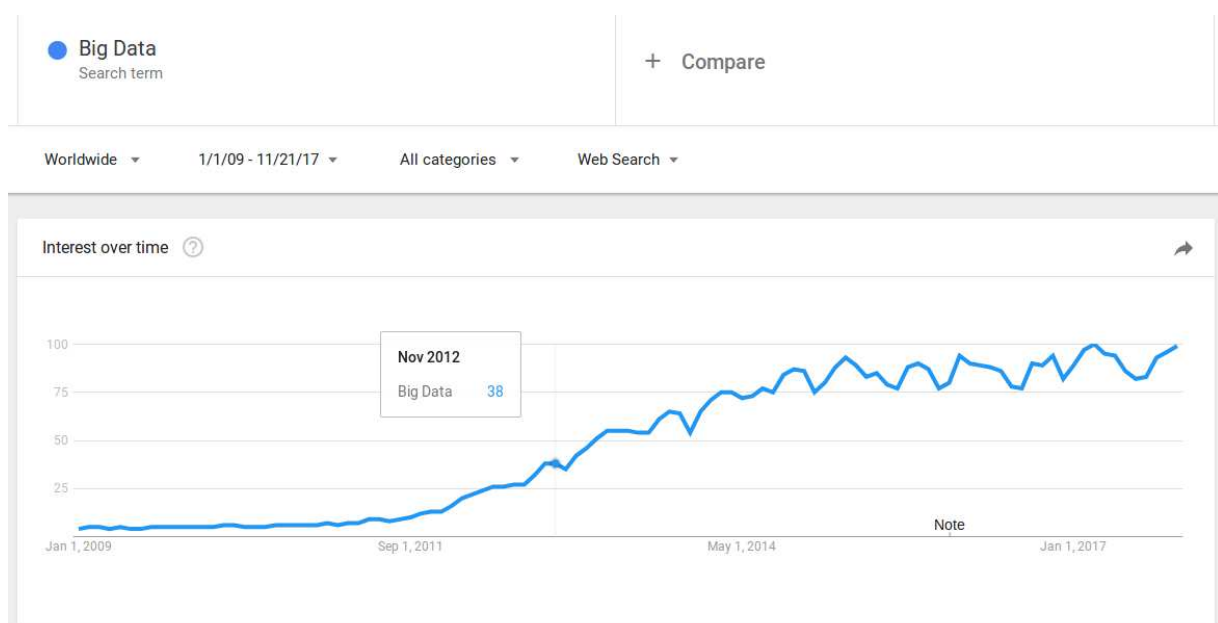


Fig. 1.1: Evolution of the frequency of term “Big Data” in Google web search queries, considering worldwide queries since 2009.

Source: Google Trends. <https://trends.google.com/trends/explore?date=2009-01-01%202017-11-21&q=Big Data>

To get a sketch of the main concepts and actors related to the definition of the term, we look at the network of Wikipedia concepts surrounding the article “Big Data”, following the methodology introduced by Markusson, Venturini, Laniado & Kalttenbrunner (2016). In this analysis we take advantage of the multi-facet nature of

Wikipedia, which is at the same time: (i) the largest existing online encyclopedia, (ii) an open collaborative effort where relevant points of view present in society are combined through negotiation and consensus, (iii) a hypertext where links represent relevant connections between concepts³.

Therefore, we aim to get insights into the definition of Big Data based on how concepts around the corresponding entry are connected to one another in the hyperlink network emerging from the collaborative content creation process. To this end, we first identified all articles linked from the text of the article “Big Data”, as the main concepts related to its definition. Then, we parsed the text of these articles to extract links between them, and we drew the corresponding network. In this network, each node represents an article and each connection a directed hyperlink; according to an established convention, links are represented in clockwise direction.

We represent each node with size proportional to its out-degree, i.e. to the number of hyperlink from the article to other articles in the set: in this way, we highlight articles whose content is more related to the topic. Colors represent different clusters of articles identified by the Louvain algorithm for community detection.

³ Borra., Weltevrede, Ciuccarelli, Kaltenbrunner, Laniado, Magni, Mauri, Rogers and Venturini, (2015).

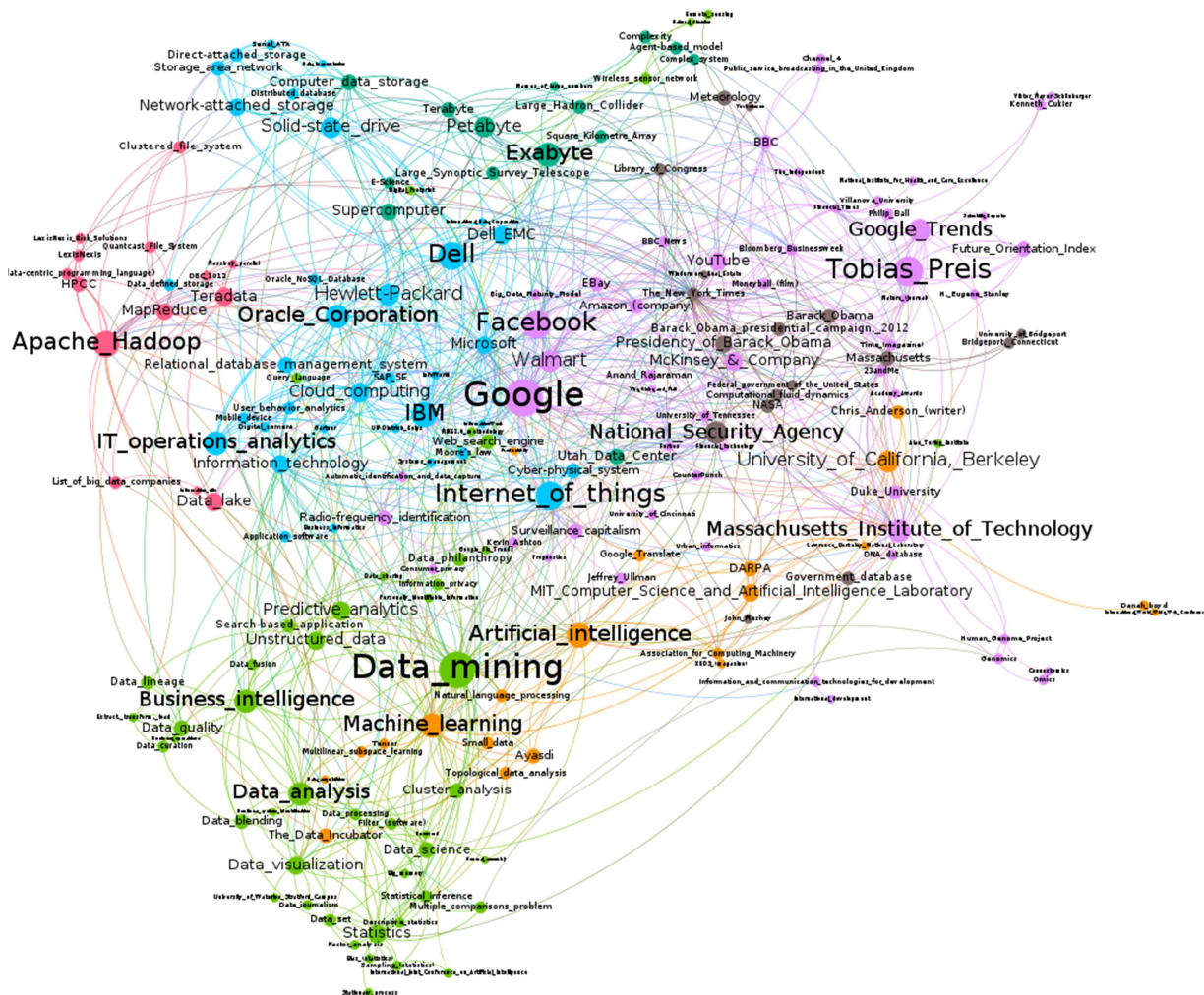


Fig. 1.2: Network of hyperlinks between entries linked from article “Big Data” on the English Wikipedia. The size of each node is proportional to its out-degree, i.e. to its number of outgoing hyperlinks to other concepts in the network. Colors represent clusters of nodes, i.e. groups of articles densely connected to each other.

We can see at the top of the Fig. 1.2, in peripheral position, concepts related to the challenges of storing big volumes of data, such as Exabyte and Petabyte, or Solid-state drive. These concepts have to do with the most basic definition of Big Data, as extremely voluminous data sets, and are connected to key technologies and companies related to the technical issues of storing and processing these data, on the left side of the network: parallel programming solutions such as the Map Reduce paradigm and Apache Hadoop (the magenta cluster), or scalable databases, cloud computing and companies offering this kind of solutions such as Oracle and IBM (the cyan cluster). On the right instead we find two clusters of articles related to key actors in

the usage of Big Data: on one hand the private sector, with companies running massive online services and collecting data of millions of users, including Google, Facebook or Youtube (the pink cluster); on the other hand the political and institutional context, including the NSA, government databases and Barack Obama's campaign (the brown cluster). At the bottom we find concepts related to mathematical methods and algorithms to exploit the data, such as artificial intelligence and machine learning (the orange cluster), data mining and business intelligence (the light green cluster).

All in all this map, although extracted from an encyclopaedia, helps to get a more pragmatic definition of Big Data, showing the main groups of concepts and actors around it, and highlighting the relevance of key players like Google and Facebook at the centre of the network. The resulting picture seems to confirm Dana Boyd's statement that «*Big Data is less about data that is big than it is about a capacity to search, aggregate, and cross-reference large data sets*» (Boyd & Crawford, 2011).

First of all, it should be immediately emphasized that the term Big Data refers to the existence of data sets that are so large and complex that traditional software is no longer suitable for managing them: «*There is little doubt that the quantities of data now available are indeed large, but that's not the most relevant characteristic of this new data ecosystem*» (Boyd & Crawford, 2011). In brief, it could be reasonable to define the Big Data phenomenon as the analysis of incredibly large amounts of information: in fact, what distinguishes them is the need for new technologies and tools to process them.

To further define the size of the phenomenon, consider that since Sir Tim Berners-Lee⁴ introduced the World Wide Web in 1990 and launched the IT revolution, the amount of digital data has grown dramatically: for example, according to a new report from IBM Marketing Cloud "10 Key Marketing Trends for 2017", 90% of the data present in the world today has been created in the last two years, and this huge amount of data is expected to grow by 40% annually over the next decade⁵. Looking for a more comprehensive definition of the phenomenon, it is useful to refer to "The Digital Universe in 2020" report, which states that Big Data represent: «*a new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data by enabling high-velocity capture, discovery, and/or analysis*» (Gantz & Reinsel, 2012).

The complexity of the Big Data phenomenon is at the base of the so-called "Big Data dilemma": this term refers to the fact that, on the one hand, these data have a tremendous value from an economic point of view, while on the other there are great difficulties on extracting value from them. As we will show in section four of this deliverable, different ways to extract value from data exist and lead to different value creation models.

Ultimately, the "Big Data" universe is defined, from a competitive point of view, as a central element to succeed in the market in the digital era (see among others, Ashley, 2016).

⁴ Sir Timothy John Berners-Lee is an English computer scientist, best known as the inventor of the World Wide Web.

⁵ See IBM Marketing Cloud (2017).

Efficiently exploited, this huge amount of data can have enormous potential, increasing efficiency in many areas of society.

To further understand the importance of this phenomenon, consider the following figure (Fig. 1.3), taken from the annual report on the digital universe, titled "*The digital universe in 2020*": it is shown the exponential growth (measured in Exabytes⁶) which has taken place since 2009 until today, including the estimated forecasts up to 2020, and the amount of data created within the so-called digital universe. Specifically, it is shown that the amount of data created passes from 2837 exabytes in 2012 to an estimate of 40000 in 2020, with a 50-fold increase from 2010 to 2020.

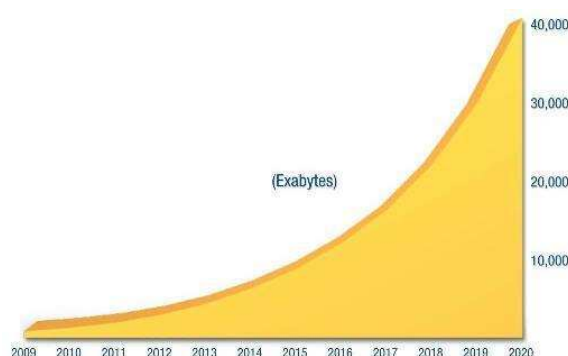


Fig. 1.3: The growth of the Digital Universe (measured in Exabytes).
Source: Gantz and Reinsel (2013).

Another significant picture is the following one, which shows, with reference to the same time span 2009-2020, the investments' trend (in trillions of dollars) to grow in time and the opposite costs' trend (per Gigabyte) to decline. Indeed, the IDC estimates that the cost (per gigabyte) in storing the bits in the digital universe will drop from \$2.00 in 2012 to \$0.20 in 2020, while, at the opposite, total investments show a clear tendency to grow along time: this empirical evidence confirms the great trust placed in the profitability of the digital universe.

⁶ The Exabyte is a multiple of the unit byte for digital information. In the International System of Units (SI), the prefix exa indicates multiplication by the sixth power of 1000 (10^{18}). Therefore, one Exabyte is one quintillion bytes. The symbol for Exabyte is EB.

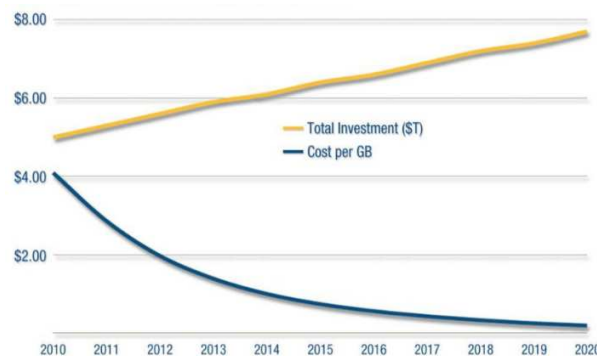


Fig. 1.4: Falling Costs and Rising Investment in the Digital Universe.

Source: IDC's "Digital Universe Study", sponsored by EMC, December 2012.

In addition, it is important to remember that there are also risks associated with Big Data, mainly represented by issues related to privacy and security (in this sense, an important subset of the Big Data universe, and which is a sector in its own right for the importance it covers, is represented by personal data⁷). Indeed, as pointed out by the "Digital Universe Study" report, the amount of data that requires protection and precise regulation will tend to grow over the next few years, from less than a third in 2010 to around 40% in 2020. In front of these issues, it is becoming increasingly important to assess the applicability to the Big Data of the institutional principle of digital commons, as understood in our analysis, trying to balance, on the one hand, the economic advantage⁸ associated with this huge amount of data and, on the other hand, the reasons of the great attention that these issues are receiving in the internal debate of the European Commission.

Indeed, if, on the one hand, we have several private companies claiming the right to use and exploit this amount of data in order to realize their trading strategies and to gain profits, on the other hand we find those who claim that access to these data should be considered a citizen's universal right, and therefore cannot be privatised.

The first position, supported by large companies such as Facebook or Google, is based on the argument that individual citizens voluntarily sell their personal data when, for example, they declare to accept the conditions required for the registration to a social network: in this sense, the problem in question would be nothing more than a privacy question and would not imply any violation of the fundamental rights of the person. In the second perspective, supported mainly by the so-called "open" movements⁹, these data are instead conceived as common goods that cannot be privatized but must be freely accessible to anyone (essentially they correspond to a service that must be guaranteed to the citizens of any democratic state).

⁷ According to the OECD Privacy Guidelines, this term refers to *any information relating to an identified or identifiable individual (data subject)*.

⁸ Here we refer to the close relationship between the ability to process and exploit large amounts of data and the ability of a business to make profits: in this regard, the study by Vitari & Raguseo (2016) highlights the close relationship between these two aspects, highlighting how the ability to process data has become today a decisive component for many businesses.

⁹ In these pages, the term "open" refers to all those movements that are based on a free ideology, promoting open access to a resource: for this reason, both open-source movement and free-software movement are included inside of this broad category.

Around these two apparently incompatible positions, the debate among policy makers is turning around the regulation and management that should be adopted in order to develop a system that is able to protect both entrepreneurship and free access, as we will see in section 2 of this deliverable.

In Bassi, Ciurcina, De Martin, Fenoglietto, Rocchi, and Sagarra (D1.8 of DECODE project, 2017, p. 85), we already stressed that the key aspect of digital commons should consist in the collective management by the community's participants: through this organizational mode, a community decides to collectively regulate the use of a resource, favouring fair access and sustainable use of the resource. The aim should be to prevent that digital commons could be subject to restrictions that preclude or restrict access to many subjects who should have guaranteed the possibility to use them.

A very useful tool to understand the nature of Big Data and implicitly assess the applicability of the common-based approach to digital data is represented by Raguseo & Vitari (2016), which examines the existing relationship between the ability of companies to leverage digital data (called Digital Data dynamic capability) and their financial performance¹⁰. In particular, the analysis developed in this work, based on an econometric study conducted on a sample of sales managers from 125 different companies¹¹, seeks to show how dynamic capabilities associated with digital data represent a crucial factor in determining the competitiveness of a modern business activity.

The basic idea behind this paper is that the level of general growth of the whole society, summed up by its financial performance, is the result of the performance of the different companies: in this sense, dynamic capabilities play a leading role in determining such a level of performance¹². In particular, dynamic capabilities can increase the efficiency and speed of organizational processes, resulting in a reduction in the costs and / or an increase in profits; in addition, they allow businesses to understand and relate to customers and their changing views, expectations and preferences; finally, they enable the development of new decision-making abilities, more appropriate to the dynamic context of the digital age.

Referring to the figure below (Fig. 1.5), we can see how Digital Data dynamic capabilities include four main components, represented by the ability to choose the most efficient and suitable IT technology for their businesses, to integrate it in their specific business activities, to manage and process available digital data, and to reuse or modify them according to their specific interests and goals. Through these actions, all linked to the use of computer technology, businesses can thus be able to approach their stakeholders, reduce costs and / or increase profits, thus gaining better financial performance. In short, DD dynamic capabilities represent a fundamental determinant in

¹⁰ Firm financial performance (FFP) is measured using the returns on sales (ROS), calculated by dividing net income by total net sales, both of which are available from the AIDA Bureau Van Dijk Databases. Thus, firm financial performance is measured as the difference between a firm's ROS and the industry's ROS to which the firm belongs.

¹¹ The analysis is based on a questionnaire-based survey between 2011 and 2012 that was distributed to firms located in Western Europe. Then, a structural equation modeling (SEM) is applied to the data to simultaneously test the measurement and structural model.

¹² With the term dynamic capability we refer to: «the ability to sense and then seize new opportunities and then reconfigure and protect knowledge assets, competencies, and complementary assets with the aim of achieving a sustained competitive advantage» (Vitari & Raguseo, p. 5).

the strategic plan of a modern enterprise, a component that becomes increasingly indispensable with the expansion of the weight of digital resources and the Internet.

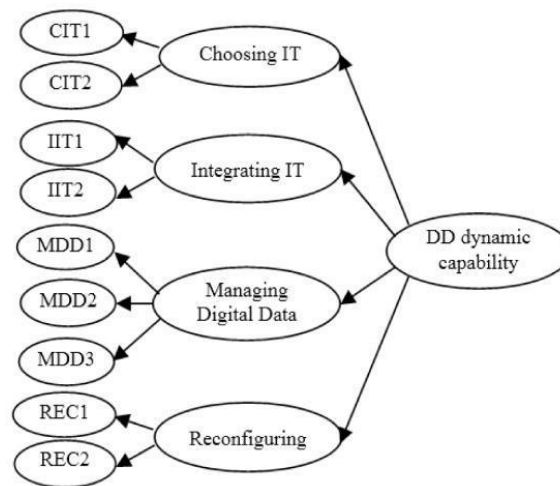


Fig. 1.5: DD dynamic capability as a second-order construct
Source: Vitari & Raguseo (2016), p. 11.

Turning the attention to the specific results of the econometric analysis developed in the paper, it is possible to summarize the following major relationships between dynamic capabilities and financial performance:

- first of all, there is a positive relationship between the level of DD dynamic capability and the financial performance of a company, although this positive relationship is not very large in the empirical results found by the econometric study;
- in addition, the more a business activity is dynamic, the more significant is the ability of DD dynamic capabilities to improve its financial performance;
- the age of a company is another significant factor: in fact, older companies are generally less able to develop the contribution of DD dynamic capabilities than the younger ones;
- finally, the size of the business is also important: the smaller the company is, the greater the contribution of DD dynamic capabilities to its financial performance.

The paper by Vitari and Raguseo, showing how the Big Data management is favoured by IT (information technologies) managing skills, does not exclude the applicability of common-based rules to these resources.

The real possibility to put into practice this revolutionary passage to Big Data as commons is still to be demonstrated and tested in the coming years¹³.

¹³ A first discussion about commons collaborative economy is the core of Fuster Morell M., Carballa Smichowski B., Smorto G., Espelt G., Imperatore P. Rebo M., Rocas M., Rodríguez N. Senabre E., Ciurcina M. (2017), D2.1 of DECODE project. <https://desk.dyne.org/s/191MbexVEDzHEks#pdfviewer>

1.2 Current and expected global industry trends

Author: Sophie Ciacciarelli and Giulia Rocchi

The use of Big Data in the digital industry is leading to a revolution, to such an extent that some have defined data as a new factor of production (Hofheinz & Mandel, 2014) or “the new oil”¹⁴. When presenting the proposal for the new General Data Protection Regulation on January 2012, the then European Commissioner for Justice, Fundamental Rights and Citizenship Viviane Reding defined personal data as the currency of today's digital market¹⁵. This phenomenon is confirmed by some statistics: according to Transparency Market Research (2013), the global market for Big Data was estimated at 6.3 billion US \$ in 2012, but is expected to get almost eight times bigger in six years, reaching 48.3 billion US \$ in 2018. IDC (2015) estimates that the worldwide annual spending in the Big Data industry will reach \$48.6 billion in 2019.

These huge trends can be explained by different factors: of course, recent technological developments have made it possible to increase the quantity of data managed at a stretch, and to reduce the time needed to analyse them. Also, the so-called “digital universe” is growing more and more, driven by an increased machine-to-machine communication¹⁶ and by the growth of the Internet of Things, which boost enormously the quantity of data available and exchanged: each year, the amount of data produced from different sources increases by 40% (McKinsey, 2011).

The Big Data market is composed of different actors, namely companies offering data-related infrastructures, software and professional services to other firms. The so-called “pure players”, that is companies making the largest share of their revenues from Big Data, account for just 5% of the overall market (EU Business Innovation Observatory, 2013), but they play an important role concerning innovation in their field. Instead, the majority of revenues in the Big Data market is generated by large, well-known companies, such as Google and IBM, that conduct also other activities.

As illustrated by the European Commission (2016), by 2020 the value of European citizens' personal data is expected to reach €1 trillion solely in the European market, getting to almost 8% of the total union GDP¹⁷. But today, more than the half of online services in the EU are provided by US companies, while 42% by EU Member States. Similarly, a major part of the actors that extract value from digital personal data is US-based: in May 2014, Google, Facebook and Amazon controlled together more than half of the market value of the twenty largest Internet companies worldwide, while none of these was European¹⁸. Finally, in 2013, among the ten leading world providers of cloud services, nine were US companies¹⁹, and in 2014, 72% of cloud service providers in

¹⁴ See Kuneva (2009), Sondergaard (2011), Rometty (2013) Qi (2016), The Economist (2017). The idea that big represent “the new oil” in the economic system has been criticized in the DECODE Report “Me, My Data and I”, see Symons & Bass (2017), D 1.7 of DECODE project, p. 54.

¹⁵ Speech pronounced on the occasion of the presentation of the new General Data Protection Regulation on January 2012. See Reding (2012).

¹⁶ Machine-to-machine, also referred to as M2M, refers to technologies that allow two or more networked devices to exchange information without the need of human intervention.

¹⁷ This data is just an estimate made by the EU: actually, there are many different ways to measure the value of personal information. This is another topic that would require further investigation.

¹⁸ See <https://www.statista.com/statistics/277483/market-value-of-the-largest-internet-companies-worldwide/>

¹⁹ See <http://talkincloud.com/datasheet/top-100-cloud-services-providers-2013-pdf>

the EU were storing data in the US²⁰. This means that a huge quantity of personal data from European citizens crosses the frontiers and is processed overseas.

Another evident gap between US and EU digital firms is shown by the per capita use of data in their two economies: Hofheinz and Mandel (2014) estimate that European countries use data less than 40% of the average in North America, while this proportion reduces to a sixth for Italy; this gap is forecast to increase further.

Therefore, Big Data management is mainly operated by dominant incumbent actors that concentrate their activity into centralised commercial platforms: this leads to vendors' lock-in, reducing the possibility for small firms to gain access to data and therefore to innovate, causing a further concentration of market power in the hands of few actors. Moreover, this centralisation may lead to a progressive loss of control by citizens over their personal data, as they are not always fully aware of how their information is exploited and stored, and they often give it away in exchange of some free services without imagining the huge economic value that their data represent for firms, and the use that will be made of them later.

The following section will describe the main differences between EU and US regulation in the field of digital data, focusing especially on the recent EU General Data Protection Regulation.

²⁰ See <https://www.skyhighnetworks.com/press/9-10-cloud-services-putting-european-businesses-risk/>

2. BIG DATA AND PRIVACY

2.1 The main differences between the EU and the US with regard to privacy protection

Author(s): Sophie Ciacciarelli and Giulia Rocchi

The two legal frameworks are quite different already from the outset, as they start from different premises.

First, in the EU, privacy and protection rights are considered as being fundamental rights: they are mentioned in the Charter of Fundamental Rights of the European Union, as well as in every national constitution of the Member States²¹. Instead, in the US there is no recognition of a right to privacy at the Federal level, although some states have put such right in their constitution. Even if this difference may appear to be more theoretical than practical, in reality it has relevant implications: indeed, in the US, the basic principle of privacy protection is that, if no law prohibits it, the use of personal information is generally permitted; instead, the general policy in the EU is to prohibit the collection and processing of personal data, unless it is explicitly allowed by a law²². This is a clear indication of the different way to consider the problem.

Another difference is that the European Union's data protection regulation is characterised by a so-called "omnibus approach", meaning that the same privacy rules apply to all the economic sectors – even if such rules are at present still differentiated among states –, in order to guarantee the maximum level of protection, no matter which type of personal information. Instead, in the United States, different rules are applied according to different industries: a specific act regulates privacy protection by financial institutions, another the disclosure of health information, and so on²³. This implies that the highest level of protection is guaranteed for sensitive personal information only, as the legislator believes that privacy interests must be balanced with the right to free expression and commerce (Wolf & Maxwell, 2012).

The approach to the right to privacy is different also from the point of view of enforcement: as explained in the study by the European Directorate-General Policies, « *While in the EU, the right as such or specific parts as implemented in data protection laws can be invoked, the US usually approaches the right from the angle of consumer protection* » (2012, p. 45).

For all these reasons, the EU decided that the level of privacy protection accorded to European citizens' data processed in the US risked not to be high enough, and provided the Safe Harbour measure²⁴, which today is not valid anymore. On 6 October 2015, the Court of Justice of the European Union had declared the Commission's 2000 Decision on EU-US Safe Harbour invalid.

In July 2016, a new framework - the EU-US Privacy shield - was set up to protect the fundamental rights of anyone in the EU whose personal data is transferred to the United States as well as bringing legal clarity for businesses relying on transatlantic data

²¹ Directorate-General for Internal Policies (2012).

²² US International Trade Commission (2013).

²³ Ibidem.

²⁴ Ibidem.

transfers. The new arrangement includes: strong data protection obligations on companies receiving personal data from the EU; safeguards on US government access to data; effective protection and redress for individuals; annual joint review to monitor the implementation. However, the new legal framework allowing data transfer to USA has been criticized and is under scrutiny by the European courts²⁵.

Instead, the imposition of the GDPR on foreign firms to comply with its provisions should create a level-playing field and guarantee to European citizens the same protection they receive in Europe; but this depends on how the new Regulation will be interpreted when it is officially applied.

2.2 The key innovations introduced by the General Data Protection Regulation

Author(s): Sophie Ciacciarelli and Giulia Rocchi

The rules concerning privacy and personal data processing are among the most decisive factors in determining the degree of competitiveness and success of European digital companies.

The current legal framework that regulates personal data processing is given by the European Data Protection Directive²⁶, came into force in 1995, a year in which it was still hard to imagine the level that technology developments would have reached in two decades. The objective was to create a minimum common framework, based on two pillars: the enhancement of the protection of individual privacy rights, and the facilitation of the movement of personal data across Member States in order to favour the development of a Single Market. But even if the Directive imposed some common base principles, the EU ended up with 28 different data protection rules, as each State was free to implement its own in a differentiated way. The European Commission (2012) estimates that the expenses for firms to conform to different European legislation amounts to almost €2.3 billion a year on the whole.

This law fragmentation across the EU was one of the reasons that pushed the European Institutions to reform the data protection Directive, by definitely replacing it with the newly approved General Data Protection Regulation (GDPR)²⁷. The Regulation shall officially apply from 25 May 2018 and will have direct applicability in each country, thus leaving much less discretionary power to any single Member State. Another important concern was the ease with which data could move outside the European borders and with which they could be processed by foreign actors: this represents an issue from two points of view. First, the risk for European users to have their data processed according to foreign, less stringent privacy rules; second, the consequent competitive disadvantage for European digital companies to be subject to more stringent rules than their foreign competitors. Additionally, under the present legal framework, it is difficult

²⁵ See T-670/16, <http://curia.europa.eu/juris/liste.jsf?language=it&jur=C,T,F&num=t-670/16&td=ALL>

²⁶ Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, OJ L [1995] 281/31.

²⁷ Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). OJ L 119/1.

for users to prosecute foreign companies in their jurisdiction in the case of a breach of privacy laws.

Probably, the most innovative aspect of the new Regulation lies in the imposition of its provisions not only to Europe-based companies, but to any actor handling European citizens' personal data, no matter where its headquarters are, and independently from where the data processing is made²⁸. Such an innovation will likely favour a level playing field between European and US digital companies, finally reducing the present compliance gap.

Below we provide the main rules established by the GDPR, to understand the likely impact that it will have on European digital companies, start-ups as well as on the most established ITC realities.

Seven main principles

1. *Principle of lawfulness, fairness and transparency*: personal data shall be processed lawfully, fairly and in a transparent manner, in relation to the data subject
2. *Principle of purpose limitation*: personal data shall be collected for specified, explicit and legitimate purpose
3. *Principle of data minimization*: the processing must be adequate, relevant and limited to what is necessary
4. *Principle of accuracy*: the processing also has to be accurate and kept to date
5. *Principle of storage limitation*: data is to be kept in a form which permits the identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed
6. *Principle of integrity and confidentiality*: data processing must be secure
7. *Principle of accountability*: the data controller is to be held responsible of any data breach

Data subjects rights

GDPR provides for rights of the data subjects, that can be consumers or not. One of the most disruptive innovations brought by the GDPR is the so-called *right to be forgotten*. Expressed in Article 17, it expands the previous "right to erasure", giving the possibility for a data subject to have her personal data deleted when they «*are no longer necessary in relation to the purposes for which they were collected or otherwise processed*»²⁹, and when «*the data subject withdraws consent on which the processing is based (...), and where there is no other legal ground for the processing*»³⁰. Moreover, this provision introduces a further duty on the controller that made the data public, imposing her to inform all the controllers that are processing those data to erase any related link, copy or replication of them. By the way, the right to be forgotten is mitigated by Paragraph 3

²⁸ Article 3 GDPR.

²⁹ Article 17.1 (a) GDPR.

³⁰ Article 17.1 (b) GDPR.

of Article 17, which states that it shall not apply when it would contrast with the right of freedom of expression and information, for compliance with a legal obligation, and for other public interest-related reasons.

Another newly introduced right, stated in Article 20 and one of the most controversial, is the *right to data portability*: «The data subject shall have the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and have the right to transmit those data to another controller». As specified in Recital 68 of the Regulation, however, the existence of such a right does not impose to controllers the obligation to adopt technically compatible processing systems; they are though encouraged to do so. Finally, the right only applies where the data are provided by the user based on his or her consent, or they are necessary for the performance of a contract. The initial rationale of introducing such a right was to avoid the customer lock-in effect, considered as a barrier to entry for new companies and thus a risk factor for competition. In fact, as Engels (2016) states, «The easier it is for the consumer to port his data from one platform to another, the lower are his costs to switch to another platform».

Actually, as this provision applies both to new-born, small enterprises and to big multinational companies, it may end up imposing excessive burdens on the former relative to the latter, thus obtaining the opposite of the wished effect (Swire & Lagos, 2013).

Burri & Schär (2016) stress that other provisions enhancing the control of European citizens over their data are: The *right to transparent information*³¹ (Article 12), the right of *access to personal data*³² (Article 15) and the *right to restriction of processing*³³ (Article 18).

Finally, another provision expected to have a big impact on businesses is the one concerning the *profiling* of individuals. Article 4 of the GDPR defines it as «any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyse or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location or movements». Article 20 considers the case in which a decision must be taken about an individual, and recognizes the right of such a user not to be subject to a decision based

³¹ «Any communication to the subject relating to her data processing shall be provided in a concise, transparent, intelligible and easily accessible form».

³² «The data subject has the right to know whether her data is being processed and, in such a case, to know about the purposes of the processing, the categories of data concerned, the envisaged period for which the data will be stored, the information about the source of the data if these were not communicated directly by the subject, and other comparable information».

³³ «It applies to different situations such as when the accuracy of the personal data is contested by the data subject, when the processing is unlawful, when the data are no longer needed for the purposes of the processing and when the legitimate grounds of the controller override those of the data subject. When processing has been restricted under these conditions, this personal data shall be only processed concerning legal claims, for the protection of another subject or for reasons of important public interest».

solely on automated processing, producing legal effects concerning him³⁴. Even if the previous Directive already contained restrictions on automated data processing and decision-making, some aspects of the Regulation are innovative, such as the need for explicit consent, the limits on the processing of sensitive data and several duties of information.

The GDPR has also reviewed and corrected in a more articulate and restrictive way the definition of “*consent*”. Article 4 (11) specifies that consent shall be intended as «*any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her*». As consent is the essential basis for data processing, this change is likely to have a great impact on a firm's responsibilities: Article 7 explains, indeed, that the request for consent has to be presented in an intelligible and easily accessible form, through a clear and plain language.

The role of the data controller and the data processor

In addition to the enhancement of all these data subjects' rights, the Regulation introduces also further indications relating to the roles of the key figures processing personal data, that is, the data controller and the data processor³⁵. In particular, the role of controllers becomes more burdensome: not only must they comply with all the provisions in the Regulation but, when asked, they also must be able to prove such compliance.

Moreover, at the time of the determination of the processing, they shall provide for specific measures in order to facilitate data protection, such as pseudonymisation and data minimisation, and to guarantee that, by default, only the necessary data for each different case are processed³⁶. Finally, where a type of processing shows a high risk with respect to the rights and freedom of natural persons, before starting the processing the controller shall carry out an assessment of the likely impact it would have on the protection of personal data³⁷, following a specific mechanism called Data Protection Impact Assessment (DPIA).

Punitive measures

Also the amount of potential fines has been increased: they can be up to 20 million EUR, or up to 4% of an undertaking's worldwide annual turnover.

³⁴ There are three exceptions to this rule: (a) the case in which such a decision is necessary for the performance of a contract between the data subject and the controller; (b) when it is authorised by Union or Member State law to which the controller is subject; (c) when it is based on the data subject's explicit consent.

³⁵ Article 4 (7) GDPR: «'Controller' means the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data».

Article 4 (8) GDPR: «'Processor' means a natural or legal person, public authority, agency or other body which processes personal data on behalf of the controller».

³⁶ Article 25 GDPR.

³⁷ Article 35 GDPR.

2.3 The uncertain impact of the GDPR: optimistic, sceptical and dramatic provisions

Author(s): Sophie Ciacciarelli and Giulia Rocchi

It is undisputed that the new legal framework that will follow the application of the GDPR will enhance European citizens' privacy and that will finally allow to overcome the present geographical fragmentation of rules, at least in theory. However, it is far less clear what the impact of this new Regulation will be on the competitiveness of European companies dealing with data, on foreign companies operating in the EU, and more broadly on international trade and on the economic growth of the European area.

The European Commission (2016) affirms that strengthening Europe's standards of protection expands business, instead of limiting it. In its Big Data Fact Sheet, the EC explains that many market studies and surveys show how the success of services and products providers using Big Data is related to their capacity to obtain consumers trust. It then emphasizes many of the aspects we have analysed above: besides the strengthened rights for citizens, it explains how data portability will create a better environment for small start-ups to access the data market, and underlines the reduction of bureaucracy and costs due to the implementation of a single regulation across the EU.

However, some studies partially deny the EC hypothesis. A research by *Taddicken* (2013) made on a sample of Internet users, shows how their own privacy concerns do not prevent them to disclose personal information online; similarly, it is evident how online services provided by US companies are used by European customers despite the latter's lack of confidence relating to privacy and data processing. According to *IDdate* (2014), while privacy concerns may limit the quantity of data disclosed by users, they have no influence on their decision to adopt an online service.

A less optimistic, but not totally opposed position concerning the benefits of the new privacy Regulation can be found in *Ciriani* (2015). The author rejects the protectionist connotation attributed to it by many other researchers: it does not impose different duties based on the nationality of the recipient, rather one of its main objectives is to make foreign providers apply the same rules as European providers, to obtain a harmonized protection and enhance legal certainty among its own citizens. As proof of the GDPR's anti-protectionist vocation, the author also points out how the policy of a so-called "Schengen Routing", which was proposed by some stakeholders³⁸ and would have implied the obligation to manage European personal data exclusively within European borders, was fully rejected by European authorities. However, even if *Ciriani* does not consider the GDPR as an element hampering transatlantic trade, he does not deem it a welfare-enhancing measure for European companies either. He mentions several studies that demonstrate how the new Regulation will translate into a net cost for European companies processing personal data, because of the cost of compliance to the new provisions and the reduction of business opportunities, which will not be offset by large enough efficiency gains.

The major sources of costs are identified with the implementation of the above-mentioned Data Protection Impact Assessment in case of high-risk data processing and

³⁸ See: <http://www.dw.com/en/deutsche-telekom-internet-data-made-in-germany-should-stay-in-germany/a-17165891>.

the mandatory notification to the concerned subject in case of data breaches. In the end, Ciriani does not oppose the GDPR overall, but he argues that it does not provide European companies with a competitive advantage over American actors, and that the costs deriving from its application are likely to offset the efficiency gains. Christensen, Colciago, Etro & Rafert (2013) advise further burdens: the need to hire new personnel, to provide the firm with new IT software, and many other necessary actions would increase on average for 20% the annual spending in IT. The UK Ministry of Justice (2012), though recognizing the positive impact deriving from law harmonization, remarked in its Impact Assessment that the additional costs would result in a net loss of £250 million for the UK's economy just during the first year of application.

There is also a consistent part of the economic literature which argues that the GDPR will end up by just shifting the cost burden of compliance from European to foreign companies, acting as a sort of trade barrier. According to the above-mentioned article by Hofheinz and Mandel (2014), the implementation of the GDPR can just increase the already existing gap in Big Data processing between EU and US.

The European regulatory framework should be more accommodating, and flexible enough to guarantee both consumers' protection and openness to new challenges and innovation. Similarly, a study by the *European Centre for International Political Economy* (ECIPE, 2013) equates the data protection cost estimates, calculated in an impact assessments, to non-tariff barriers imposed on US firms. Their assessment shows as a consequence a decrease of both US services exports to the EU and EU exports to the US, with a welfare negative effect amounting to more than 1000 euro per year for a household of four people in Europe.

2.4 The major obstacles to the expansion of European data-driven digital businesses. Some mainstream views.

Author(s): Sophie Ciacciarelli, Stefano Lucarelli and Giulia Rocchi

If we consider all the above analysed factors, it gets clear how the optimal trade-off between the need for innovation and the need for personal data protection and data sovereignty has not been achieved yet. But other factors affect the functioning and development of data-related activities.

Regulations on cross-border data flows

The current data protection Directive differentiates between the transfers of data among EU Member States (always permitted) and those towards third parties — only if they exhibit an adequate level of protection (Kong (2010)— although there are some exceptions³⁹.

Actually, as stressed in a document by the Steering Board of the European Cloud Partnership (2014, p. 19), also within Europe *«Member State practices and in some instances national laws restrict the possibility of storage and processing of certain data*

³⁹ Exceptions to the rule were admitted under the so-called "Safe Harbor Decision", a voluntary data protection code through which US companies were authorized to treat EU citizens' data after declaring their compliance with European standards. In 2015, the European Court of Justice annulled the Decision and signed a new agreement on 2 February 2016: the EU-US Privacy Shield. However, the abovementioned "adequate level of protection" will be henceforth guaranteeing, given the updated geographical extension of the new Regulation.

(especially public sector data) outside their territory». According to a study made by the Swedish National Board of Trade (2014), the most common restrictions imposed by national governments take the form of legal requirements to store data⁴⁰ and locate data centres within a country's borders and restrictions in the ability to move and process personal data across borders.

The rationale of these measures is straightforward: by imposing such restrictions, a government finds it easier to prosecute a company in case of privacy laws violation, even if sometimes they are just put in place for protectionist reasons. In general, as underlined in a document by the Business Roundtable (2015)⁴¹, countries which are more globally connected increase their GDP growth by up to 40 percent more than less connected countries, and the removal of barriers to cross-border data flows leads also to higher wages, sales and employment. The Business Roundtable's view needs to be deepened and discussed. Indeed it is true that in a first phase the removal of barriers to cross-border data flows is positively correlated with the main economic macro-aggregates. However the economic development is a dynamic phenomenon: it is then possible that in a second period the situation evolves by determining an asymmetric relation between developed and underdeveloped countries, also in line with the analysis by Hofheinz and Mandel (2014) that we considered above (see §1.2). As we previously stressed (see §1.1), the exploitation of data may be maximized only in economic systems characterized by dynamic capabilities to improve financial performance. Furthermore, losing control of data can affect the creation of critical capabilities in new industrial sectors (e.g. Industry 4.0 and Artificial Intelligence) characterised by mass automation of production, where who owns the data and the AI services created with that data becomes critical.

Different VAT rules across EU member countries

A further legal obstacle for digital companies to develop across the EU is given by the different VAT rules across countries, which cause significant compliance costs mostly for small enterprises: different countries apply different rates, referring to different categories of products and services⁴². Moreover, due to the "Low Value Consignment Relief", traders outside the EU are sometimes exempted to charge VAT to private customers, causing a competitive disparity with Europe-based firms. For these reasons, the EC is considering different solutions to reduce the burden at least for start-ups⁴³: a first attempt was to propose a VAT threshold for small companies but, as this option was rejected by Member States, other insights must be found.

Access to capital for start-ups and scale-ups

A recent Action Plan edited by the European Commission (2015)⁴⁴ has analysed the present state of the European capital market. European national capital markets are described as still relatively undeveloped and fragmented: even if the European economy is as big as the American one, the size of its equity markets is less than the half

⁴⁰ Especially some types of data, such as personal, geolocation and payment card data.

⁴¹ As explained on its website, the Business Roundtable is «an association of chief executive officers of leading U.S. companies working to promote sound public policy and a thriving U.S. economy».

⁴² Directorate-general for internal policies (2015).

⁴³ European Commission (2015a)

⁴⁴ European Commission (2015b).

of the latter's, and that of its debt markets less than a third. Moreover, there is a huge gap among the single national markets. In addition, the report explains that European SMEs receive more than 75% of their external finance from banking loans, meaning that they receive five times less funding from capital markets compared to US enterprises. The problem does not originate from a shortage of investable capital in the EU: on the contrary, European investors find it difficult to enter profitable investment plans, and there is a lack of investment opportunities. The likely cause of this situation is the absence of a unified European financing system, and the consequent barriers to capital circulation across Members.

There are also some differences between how capital is invested in Europe and in the US. Indeed, two different scale-up strategies can be identified⁴⁵. One is the so-called "scale to mass", whose initial focus is to acquire many users as possible after having implemented a sound base technology. The other is the so-called "revenues from the start": in this case, the company is more focused on generating high revenues from the start, which are supposed to grow exponentially through the following investment cycle. For this second category, it is harder to scale-up in the Old Continent than in the US, as there are not many venture capital funds willing to invest million of euros in these activities.

Other significant differences between EU and US lead to different investment frameworks. First, the different visions by venture capital funds operating in the two geographical areas: while European funds tend to concentrate their investments in a small pool of promising companies, the Americans' are more focused on gaining a small interest in many start-ups. This aspect has for sure an important influence on the market composition of technology SMEs, which in the US is more various and dynamic. Second, there are differences also in what the venture capital funds expect from the enterprises in which they invest. In Europe, companies are expected to provide many details about their objectives and the strategy to reach them; there is low flexibility from the investors, and unforeseen changes in the schedule are not encouraged. In the US, it happens the contrary: when a new insight is considered beneficial for the activity, it is well accepted also by the investors.

Lack of entrepreneurship culture

A study⁴⁶ carried out for the European Commission by TNO, Deloitte and IDATE explains the main factors that limit entrepreneurship in Europe, analysing the regulatory, cultural and psychological issues. Concerning the regulatory environment, the study underlines the complexity of the European rules to start and manage web businesses: as web entrepreneurs are not trained to manage bureaucratic aspects, they lose a lot of time and resources in accomplishing them. Another problem is related to education: differently from the US, in Europe there is generally a clear distinction between economics and engineering curricula: a deeper entrepreneurial education would instead be useful to more technical students too, also by introducing as professors the founders of successful start-ups, to push a more dynamic view. A further concern related to instruction is that most of IT studies in Europe are more focused on teaching already-existing technologies instead of emerging ones, that are potentially subject to a very rapid growth. Finally, considering merely the social and psychological framework,

⁴⁵ Directorate-general for internal policies (2015).

⁴⁶ European Commission (2013).

the study remarks the existence of a marked refusal of failure in Europe. Individuals are not encouraged to become entrepreneurs, even more so in a sector, such as the ITC one, characterised by a high degree of risk.

2.5 Towards an alternative framework: stressing the role of the little-known data brokers industry.

Author: Giulia Rocchi

The tremendous volume of data digitally produced by users every day is gathered both by the entities they directly interact with, and by companies known as “data brokers”, operating behind a veil of secrecy without direct regulatory oversights and constituting «a multi-billion-dollar industry that largely operates hidden from consumer view» (US Senate Committee on Commerce, Science, and Transportation, 2013, p. 4). Indeed, the data these little-known entities collect do not primarily come from consumers first hand, but are rather sourced from other businesses. Furthermore, most of the services and products provided are not consumer facing, being instead offered to a vast spectrum of both commercial and institutional clients, frequently by merging online and offline information. Moreover, consumers are often prevented from accessing, correcting, opting out, or requesting deletion of the information data brokers hold about them (United States Government Accountability, GAO, 2013; Federal Trade - FTC, 2014, p. 3).

Neither United States nor European authorities provide a clear-cut definition of “data brokers”, arguably because of their widespread and quite unexplored operating range. Overseas, a Federal Trade Commission report published in 2014 defines them as «companies whose primary business is collecting personal information about consumers from a variety of sources and aggregating, analysing, and sharing that information, or information derived from it, for purposes such as marketing products, verifying an individual’s identity, or detecting fraud» (FTC 2014, p. 3). Analogous definitions have been previously endorsed both by the US Government Accountability Office (2013) and the US Senate (2013).

In Europe, the array of denominations used to refer to data brokers mirrors the multicultural and multilingual reality of the continent and, when the term is adopted, it tends to reflect the definitions suggested by US discussants⁴⁷.

An empirical analysis of the emergence of an “identity market” where personal data emerges as a valuable commodity, and where data brokers have a major role to play has been undertaken in Europe in the context of the D-CENT project (Bria, Ruiz, Galdon Clavell, Zavala, Fitchner, Halpin, D3.3 for D-Cent Project, 2015). This study takes a broader perspective on understanding the role of personal data and identity in the digital economy, taking into account externalities, social construction of value, etc. Empirical cases are analysed in the field of consumer financial data, sharing economy, digital identities in public service provision, political profiling and personal data market in e-education.

The authors of a recent study, using an as brief as efficient definition, describe a “data broker” as «a company or business unit that earns its primary revenue by supplying data or inferences about people gathered mainly from sources other than the data subject

⁴⁷ See for instance: European Data Protection Supervisor (2014).

themselves» (Rieke, Robinson, Tu & Hoboken, 2016, p.4), adding also that these peculiar intermediaries «*often work hand-in-hand with large online advertising platforms, such as Facebook and Google, to help target advertisements»* (ivi, p. 24). The term “inference” plays an essential role in the data brokers’ activities, since the huge sample at their disposal, along with the ever-increasing advances in new technological forms of tracking and analysis, allows them to derive data from existing information⁴⁸ and to group users into categories, some of which appear potentially sensitive because focused, for instance, on ethnicity and income levels⁴⁹.

At the same time, a user’s belonging to a certain cluster may prevent them having access to a given service or product, especially when “modelled” profiles “score” the likelihood for future behaviours’ occurrence⁵⁰. For instance, a credit card provider in the US employed a behavioural scoring model which used information about expenditure on things such as marriage counselling, psychotherapy and billiards to determine how much credit to offer customers.⁵¹

Without examining in detail the universe of information that data brokers collect, compile, package, and sell to their customers, we can generalize by affirming that potentially nothing is out of bounds: identifying, demographic, financial, travel, health, sexuality, religion, and general interest data are all routinely caught and aggregated. With reference to the above mentioned investigations, it can be asserted that a wide range of sources feed the data broker industry: from publicly available data collected using “web crawlers”⁵² (such as government records, business listings and self-reported social networks information), to non-public records obtained by ownership/use/right to resell contracts concluded with private entities (such as retailers, financial institutions, online advertising networks, registration websites and, most of the time, other data brokers) to, in closing, online tracking data achieved by acquiring web browsing histories or mobile devices’ handling (with their countless associated applications) by users. After studying the activities of nine representative data brokers, and finding out that only a few evaluate properly the quality and legitimacy of their non-public sources, the nationwide consumer protection agency revealed that:

Data brokers collect and store a vast amount of data on almost every U.S. household and commercial transaction. Of the nine data brokers, one data broker’s database has information on 1.4 billion consumer transactions and over 700 billion aggregated data elements; another data broker’s database covers one trillion dollars in consumer transactions; and yet another data broker adds three billion new records each month to its databases. Most importantly, data

⁴⁸ For example, a data broker may deduce a consumer’s marital status based upon use of the prefix “Mrs.” that the consumer has selected while filling an online form for, say, the purchase of a flight.

⁴⁹ «*Other potentially sensitive categories highlight a consumer’s age such as “Rural Everlasting,” which includes single men and women over the age of 66 with “low educational attainment and low net worths”, while “Married Sophisticates” includes thirty-something couples in the “upper-middle class . . . with no children.” Yet other potentially sensitive categories highlight certain health-related topics or conditions, such as “Expectant Parent,” “Diabetes Interest,” and “Cholesterol Focus”»* (FTC 2014, p. 47).

⁵⁰ «*For example, while a data broker could infer that a consumer belongs in a data segment for “Biker Enthusiasts,” which would allow a motorcycle dealership to offer the consumer coupons, an insurance company using that same segment might infer that the consumer engages in risky behaviour»* (FTC 2014, p. 14).

⁵¹ Symons & Bass (2017), D1.7, for DECODE project, p. 21.

⁵² Software programs that automatically capture data across the Internet and send them back to the data broker’s servers.

brokers hold a vast array of information on individual consumers. For example, one of the nine data brokers has 3000 data segments for nearly every U.S. consumer. (FTC 2014, p. 47)

The data acquisition phase is followed by the one devoted to the development of products created for marketing and risk mitigation (which includes identity verification and fraud detection) purposes, as well as for law enforcement and counterterrorism objectives. These products consist of both raw/actual data elements (generally used to create and sell lists of consumers with similar traits) and, as anticipated, additional modelled/derived data elements. For example, a data broker might infer a person's gender in the light of her shopping preferences, or predict a loan default based on her financial history. Common data broker products comprise lists of consumers assembled in "data segments" based on expected attitudes; predictive "look-alike models" about a person built on similarly-targeted people whose data the broker already possesses; marketing/credit/fraud "scores" to foresee future behaviours; and "data appends", namely additional information to fill gaps in a given consumer profile. The total annual revenue for the nine data brokers scrutinized by the FTC was around \$ 426 million in the 2012, almost half of which coming from the least regulated sector, namely the one of marketing⁵³.

On the demand side, many categories of clients make use of data brokers' products: educational and governmental institutions, advertisement and Telecom companies, non-profit organizations, insurance and financial services firms, and so on. Among the respondent companies to the above cited US Senate's inquiry, aimed at shining a light on the arena of data brokers' marketing outputs, Acxiom disclosed that its customers at that time included:

47 Fortune 100 clients; 12 of the top 15 credit card issuers; seven of the top 10 retail banks; eight of the top 10 telecom/media companies; seven of the top 10 retailers; 11 of the top 14 automotive manufacturers; six of the top 10 brokerage firms; three of the top 10 pharmaceutical manufacturers; five of the top 10 life/health insurance providers; nine of the top 10 property and casualty insurers; eight of the top 10 lodging companies; two of the top three gaming companies; three of the top five domestic airlines; six of the top 10 U.S. hotels. (US Senate Committee on Commerce, Science, and Transportation, 2013, p. 29)

It is worth to note that the European data brokers marketplace is not commensurate with the one of the US, this latter being characterized by clear leading companies as opposed to the highly fragmented old continent's landscape, although some of the largest US data resellers' companies are expanding into Europe (Rieke et al. 2016). On the contrary, from a legislative perspective, the forthcoming General Data Protection Regulation, along with several others complementary measures, equips Europe with a comprehensive data privacy framework. As already anticipated by D-Cent EU research (Bria et alii 2015, p. 80), the new regulation opens up spaces of realization for economic,

⁵³ In a previous report the FTC noted that the Fair Credit Reporting Act, which represents one of the most important parts of the sector-specific legal patchwork within the US privacy and data protection regulatory framework, regulates consumer reporting agencies ("CRAs") that sell data for credit, employment and insurance purposes, but does not apply to data brokers that sell data for other scopes (including, for example, marketing). See: Federal Trade Commission (2012).

political and technical alternatives to preserve collective data ownership in today's data-driven platform economy, while preserving citizens' rights, privacy, and data protection.

Conversely, in the US «the federal privacy framework for private-sector companies comprises a set of more narrowly tailored laws that govern the use and protection of personal information - that is, the laws *«apply for specific purposes, in certain situations, to certain sectors, or to certain types of entities»* (GAO 2013, p. 7). In any case, American industries representatives generally argue that self-regulation provisions minimize the need for further privacy legislation, which would instead lower consumer benefits and inhibit efficiency and innovation.

This is clearly a controversial point. As argued by many authors (among others Morozov 2015), and as we will argue in section 4 of this deliverable, the world's top tech companies are failing to offer their users basic disclosures about privacy and surveillance. Moreover disclosure about collection, use, sharing and retention of user information is poor. The ability by citizens to make informed choices about exactly how their data is being used represents a relevant variable not only for increasing consumer benefits, but also to support new patterns of technical, social and political innovations.

Indeed, in line with DECODE project's aims (D1.7 DECODE project, p. 16), the ability to specify how data is shared and with whom, together with privacy-preserving tools, could:

1. Encourage people to participate in digital democracy
2. Support the development of platform cooperativism - models of economic exchange which have social and ethical objectives
3. Enable data to be used for social good through the creation of a set of data commons.

Bassi, Ciurcina, De Martin, Fenoglietto, Rocchi & Oleguer Sagarra (D1.8, for DECODE project, 2017) move towards this research's line focusing on how the DECODE technology, (particularly, the features that allow writing and adopting smart rules), allows the processing of personal data in compliance with the EU regulation on privacy.

3. DATA-DRIVEN PLATFORMS AND COMPETITION

3.1 The peculiarity of data as a good

Author(s): Sophie Ciacciarelli and Giulia Rocchi

As we have seen, data is becoming a more and more essential input for successfully driving many digital activities. It is thus normal to wonder whether the possession and use of Big Data give rise to a competitive advantage for firms, and if a high concentration of this information in the hands of few companies may harm their competitors as well as, indirectly, final consumers.

Addressing this issue is far from being easy: actually, there is still no agreement about the role of competition law towards the Big Data business.

In its Guidelines on the effect on trade concept⁵⁴, the European Commission specifies that « *the new system* » determining the ground of jurisdiction of European competition rules, « *obliges national courts and competition authorities to apply the EU competition rules to all agreements and practices capable of affecting trade between EU countries* » (EC, 2004). The Commission follows these rules in assessing market power and the market structure, and to verify whether any undertaking has a dominant position. In general, the assessment is usually based on an undertaking's turnover, or on its volume of total sales in the market relative to the product considered. However, some characteristics of data differentiate it from traditional products and services normally traded in markets, which makes it hard to follow the usual pattern to assess its impact on competition.

First, as many companies do not extract value from data by selling them, but rather by using them to improve the services they offer – often for free –, or to better target advertisings, data can be considered an extremely atypical product, which challenges the traditional assessment of an undertaking's trade volume, usually based on monetary transactions.

Second, data are non-rival goods⁵⁵: if a firm owns and processes a particular dataset, for instance containing a user's age, gender and address, this does not prevent other actors from using the same information, also for a different purpose. Also, data do not use up. Even though, in theory, this characteristic could make people think that data are a kind of public good, in practice the question is less simple: as access to data may be very costly, it may act as a barrier to small and medium companies.

Another similar characteristic attributed to the sector is the so-called “data are everywhere” argument: many observers advocate that data do not generate market power, based on the fact that the collection of data is getting more and more widespread, and thus its availability is not limited. In fact, value creation depends not much on data themselves, but on the knowledge that can be extracted from them, meaning that the same final result may be obtained starting from different sets of

⁵⁴ Commission Notice Guidelines on the effect on trade concept contained in Articles 81 and 82 of the Treaty, Official Journal C 101 of 27.4.2004.

⁵⁵ As defined by Schepp & Wambach (2016).

data⁵⁶. For instance, the same information about movies preferences of users may be inferred by analysing their visualizations on Netflix, but also by taking into account their search queries concerning movie trailers on search engines.

However, as remarked in a report by the French and German antitrust authorities⁵⁷, the relevance of this argument « *depends crucially on the accessibility of data (...) and on the substitutability between data of different types* », and that « *appreciating the extent of this substitution can be hard* » (2016, p. 44). For example, there are important differences between the purchasing information that can be obtained by offline sellers and the one that can be gained by online sellers: only in the second case it is possible to observe which products the customer has considered before making his final choice, a piece of information that can be processed to better understand consumers' choice dynamics. A similar consideration about data-related product substitutability, though not concerning the digital market, was made by the European Commission in its TomTom/Tele Atlas merger decision⁵⁸.

In this case, « *The degree of demand-side substitutability between digital map databases for navigation purposes and for non-navigation purposes must be regarded as limited, because the quality requirements are very different* » (2008, p. 6, §22): in particular, it considered the need for a database for navigation to be more detailed, accurate and updated compared to a database for non-navigation purposes, the latter providing just simple services such as route planning and address location. In addressing the issue of market power assessment, the concept of product substitutability and its evolution across time should thus never be neglected.

3.2 The structure of the big data market: challenges in defining potential competition issues

Author(s): Sophie Ciacciarelli and Giulia Rocchi

As we have seen, the atypical structure of the Big Data ecosystem challenges the traditional market structure. The OECD⁵⁹ indicates, in particular, three critical points that make it hard to assess potential competition issues: (1) challenges in defining the relevant market, (2) challenges in assessing the degree of market concentration, (3) challenges in assessing potential consumers' detriments.

Definition of the relevant market

When the European Commission scrutinises a case for which it needs to assess the degree of competition in a given market - such as anti-competitive agreements, mergers and abuses of dominant market position -, the first stage of the process consists of defining the relevant market(s). This usually means identifying the market of the

⁵⁶ Ibidem. For a discussion on the issue of how access to data represents a key factor that, by enabling network effects, can represent, when data is not made available to competitors, a barrier to entry and a decisive element for excessive market dominance see Symons & Bass (2017), D1.7 of the DECODE project, pp. 25-26.

⁵⁷ Autorité de la concurrence and Bundeskartellamt (2016).

⁵⁸ European Commission (2008), Commission decision of 14/05/2008, Case No COMP/M.4854 - TOMTOM/TELE ATLAS.

⁵⁹ OECD (2014).

product concerned by the investigation, as well as the products or services considered by consumers as its substitutes, the geographic market and a time dimension.

Concerning the businesses processing data, this is a quite complicated issue, due to two factors:

- Traditional market definitions are based on economic transactions: even if data plays an important role relating to a company's turnover, if it involves no monetary transactions – e.g. a company uses data to improve its own services but does not sell it –, then the data market is not considered as relevant. This has been the EC's approach so far.
- The multi-sided characteristic of platforms: this means that the market is not constituted by the typical producer/seller/consumer relationship, but by a complex interplay of actors playing differentiated roles, which implies the existence of a stream of data flows in various directions.

In a recent paper⁶⁰, the OECD defines such actors operating in the Big Data ecosystem as:

- ✓ *Online platforms*, that constitute the main interface between consumers and other market players. This category can be further divided into:
 - *Attention platforms*, which provide “free” services to final users that are financed by advertising. In this case, the data submitted by users, as well as their attention towards advertising banners, may be considered as the fee to pay for the “free” service. Data are also used to improve both the quality of the service and the advertising targeting. A typical example is given by social networks and search engines.
 - *Matching platforms*, which provide a marketplace allowing different players to interact. They usually charge one or both users' sides for accessing the service, and collect their data to improve the quality of the matching algorithms. A typical example is represented by shopping sites, employment sites, dating platforms and so on.
- ✓ *Content providers*, which create the informative content to be put in platforms to reach final customers. Examples are online journals and websites in general.
- ✓ *Sellers*, which use platforms as marketing channels to make their products or services reaching final consumers. They may include manufacturers, professionals, financial institutions or other players facing high levels of competition in their relative market. The largest among these players may also create value by processing Big Data originating directly from their own activity, as Amazon does.
- ✓ *Infrastructure providers*, providing Big Data-related services to companies who cannot handle it by themselves. Indeed, mining, collecting, storing and processing data may result very expensive for small and medium enterprises: these IT infrastructures provide them with both a software to handle Big Data and a centre to store their data and process it.
- ✓ *The public sector*, which is highly data-intensive due to its collection of data from private citizens but also public services as well as buyers and sellers.

Among these various actors, some may also play more than one role: if we consider for instance the brand “Apple”, we can see that it acts simultaneously as owner of the platforms which work on its own devices, as a seller of physical products advertised also

⁶⁰ OECD (2016).

on other platforms, and as provider of IT infrastructures. This further complicates the matter of defining the product and the market.

One of the most common methods used to define a product's relevant market is the "Small but Significant Non-Transitory Increase in Prices" (SSNIP) test, described by Filistrucchi, Geradin, van Damme & Affeldt (2014) as the test defining « *the narrowest market (collection of products plus geographic area) for which a single firm could sustainably raise prices or otherwise exercise market power* » (2014, p. 295). This test, however, was conceived in relation to single-sided markets, while it does not suit to multi-sided markets, because of the presence of more than one product and more than one consumer, and of the existence of zero-price transactions: in this domain, questions arise about which of the multiple sides should be considered as the relevant market, relating to which product.

To address this problem, some researchers proposed a slightly different version of the classic SSNIP test: for example, Filistrucchi suggests, in his paper⁶¹, to consider a different market for each side of the platform with regards to attention platforms, while, in the case of matching platforms, just one product market.

Assessment of the degree of market concentration

The price structure of Big Data constitutes one of the main obstacle also to the assessment of market power, and thus of market concentration, together with the usually multi-sided structure of digital markets.

Offering to customers a service that is apparently free, while in reality it implies a "fee" represented by the concession of their personal data, may hide the real transactional nature of data: one may misleadingly think that a free good cannot give rise to competition concerns and centralization of market power, as we may tend to associate the concept of monopoly or oligopoly with the idea of high prices and control over them. Actually, as explained by the OECD (2016), offering free services may be part of a strategy to attract a precise category of consumers, to then become able to exert market power over other groups of participants; it may also be used to exercise power over dimensions other than prices. Examples of this strategy are a reduction in the quality of the product offered for free, the imposition on consumers to visualize and tolerate a huge amount of advertisements, and even a reduction in the standards of privacy. In this field, it is thus more relevant to consider, as a source of market power, factors other than a firm's sales and prices, without neglecting the two-sidedness of the market which, according to Filistrucchi, Geradin & van Damme (2013), is a crucial aspect to competition assessment.

In their paper, Evans and Schmalensee (2007) identify the five fundamental factors that, according to their studies, determine the relative size of competing two-sided platforms; they include (i) network effects, (ii) congestion, (iii) economies of scale, (iv) platform differentiation, (v) multi-homing. These five factors prove useful to address the problem of competition in the digital market of Big Data.

(i) The first factor is given by *network effects*. Generally speaking, the "network effect" expression defines the positive or negative effect that the use of a certain good or

⁶¹ Ibidem.

service by a user produces on the other users. In the case of multi-sided platforms, it may concern users that operate on the same side of the platform, in which case it will be regarded as “direct network effect”, or players operating on the other side of the platform, in which case it will be called “indirect network effect”. Putting it simple, if we consider the functioning of social networks, positive direct network effects exist on the users’ side, as more people use the social network, the better for the other users. In this case, indirect effects are more ambiguous, as a higher number of users on one side benefits advertisers on the other side, but the contrary is not true. According to Evans and Schmalensee, « *indirect network effects between the two sides promote larger and fewer competing two-sided platforms* » (2007, p. 164), especially when such effects are positive for both sides.

(ii) This characteristic may cause a positive feedback, for which more and more users tend to concentrate in just one platform. The level of market competition decreases, even if, at a certain point, *congestion* may interrupt this process: indeed, the latter is considered another of the factors influencing the size of a multi-sided platform, as over a certain size search and transaction costs may increase.

As noticed by the *Autorité de la concurrence* and the *Bundeskartellamt* (2016)⁶², network effects may also be considered as a barrier to entry, as they considerably reduce the incentive for new users to join a new platform due to its low customer base. In such cases, data processing likely amplifies this effect. On the other side, they may produce a positive impact on newly-created platforms when these prove able, from the beginning, to attract users thanks to some innovative features, and this condition is then amplified due to network effects themselves; from this point of view, direct network effects prove beneficial for competition.

(iii) A third factor is given by *economies of scale*, as the activity of many digital platform markets is characterised by high fixed costs and low variable costs: search engines, for instance, need high levels of initial investment to create the algorithms and the computing centres needed to process data but, once established, the costs for an additional user are quite low. This factor has certainly a positive relation with market concentration, and thus needs to be taken into account when assessing power related to data-intensive digital platforms.

(iv/v) *Multi-homing* refers to the condition in which a customer uses more than one service of the same type, through different providers; the higher the level of *differentiation* among platforms, the more likely users will multi-home. Even if, from a logical viewpoint, this feature should reduce market power concentration, actually it will be quite unlikely to observe a market with a perfect multi-homing situation. Indeed, the use of multiple platforms is influenced by switching costs, of different entity and type: for example, the time to learn how to use them, the related network effects, the incentive to keep them all updated in case of social networking, and so on. Moreover, data collection may further increase customers’ switching costs as the more data are collected about a user, the better the service provided thanks to profiling, and thus the user will be incentivized to use more and more the platform to which he is most used to. It can be thus concluded that the simple fact for a service of being free, does not automatically mean that its relative market is characterised by multi-homing: instead, if new entrants are not able to match the quality of services provided by incumbents, it

⁶² Autorité de la concurrence and Bundeskartellamt (2016)

will be impossible for them to use price strategies to attract users, and thus become very hard to stay in the market⁶³.

Market power in digital markets is considered, by some, as vulnerable and not durable, due to the ease for innovative undertakings to displace incumbent actors: an example is the sudden displacement operated by Facebook on MySpace in the social networking domain, and the rapid overtaking of Yahoo made by Google as search engine. This characteristic may appear as a proof of low entry and development barriers in the digital market. Actually, the existence of dynamics of this kind should be verified on a case-by-case basis, as characteristics such as an easy access to market and a rapid growth possibility should not be taken for granted for all digital services. Not only entering a new sector requires considerable R&D and marketing expenses, but it should also be considered that many past successful new entrants, when they started, were successful because they focused their activity on particular niches, and that the analysis of past cases may be misleading due to changed market conditions the meantime. The potential degree of competition is further reduced if we consider the frequency with which incumbents buy out new promising, innovative actors⁶⁴.

However, once considered all these aspects, a question arises about how the extent of a potential firm's market power in data could be measured, and which value should be attributed to data. Graef (2015) suggests that, instead of considering characteristics such as the amount or quality of data or simple factual information, which may be difficult and subjective to assess, an objective way would be to look at the firm's ability to monetize the collected information, not only if selling data to third parties, but also according to the delivery of targeted advertising⁶⁵ or other similar activities. If a particular player does not monetize its dataset in any way, but it is equally considered a dominant player in the market for data, a proxy of its degree of market power may be assessed by considering potential competition.

Assessment of consumers' detriment

Frequently, anticompetitive behaviours are also evaluated based on the harm they cause on consumers. In the Big Data domain, the most relevant detriment to consumers deriving from a concentration of market power, seems to be the negative impact on the degree of privacy protection granted to consumers, as the lower the choice of providers, the lower their efforts to differentiate from the others based on aspects such as quality and privacy protection. The risk of a reduction in the level of privacy protection is even more important for European citizens when considering the centralization of data by companies outside the EU, due to the different, and in most cases lower, privacy safeguards. It is noteworthy to specify that an infringement of privacy laws, besides harming directly the concerned customers, may also distort competition: for example, if an undertaking processes a higher quantity of data than it was permitted by the user, it will use it to provide a better service, and will therefore gain an unlawful competitive advantage over the other providers. However, competition authorities still do not agree on the role exercised by privacy on market power assessment, as some consider it as an issue that should just be confined to the domain of privacy law.

⁶³ As suggested by Autorité de la concurrence and Bundeskartellamt (2016).

⁶⁴ An example is the recent, well-known acquisition by Facebook of the WhatsApp messaging service.

⁶⁵ For example, Facebook does not sell its users' data to other parties, but it uses it to improve its service of targeted advertising.

3.3 Is there a link between privacy and competition?

Author(s): Sophie Ciacciarelli and Giulia Rocchi

At present, a debate is going on⁶⁶ about whether privacy issues should be assessed within competition proceedings. While some⁶⁷ state that data protection is a subject exclusively related to EU data protection rules and thus it falls outside the scope of EU competition rules, others believe that some behaviours related to data protection have an impact on digital companies' competitiveness.

Swire (2007), for instance, shows a "simple and general way" to understand the role of privacy in antitrust law, which he supposes fitting within traditional antitrust analysis. In particular, he underlines two categories of harms concerned with personal data:

- *Consumer welfare*. The welfare of final consumers is a crucial aspect within competition law. Both the US Supreme Court⁶⁸ and the European Commission⁶⁹ defend consumers' interests through its application. According to Swire, « *where dominant firm behaviour or a merger creates privacy harms, then these harms are a natural part of antitrust analysis. It would be illogical to count the harms to consumers from higher prices while excluding the harms from privacy invasions—both sorts of harms reduce consumer surplus and consumer welfare in the relevant market* » (2007). In fact, the author suggests to place on an equal footing all the factors that ultimately damage consumers, such as higher prices and a lower degree of privacy protection.

- *Quality of product or service*. As Swire highlights, under traditional antitrust analysis, a consequence of the exercise of market power may be the reduction in quality of the final good. If a genuine competition causes optimal allocation of resources, in a perfectly competitive market, consumers' freedom of choice among different products should have effects not only on products' prices, but also on their quality. The author also mentions some cases⁷⁰ in which the courts officially recognized monopoly power as a possible cause of a reduction in product quality. The degree of consumers' control over their data can certainly influence a digital service's perceived quality, at least for users with high privacy preferences.

Through this analysis, the author shows how the influence of privacy policies on competitions issues does not need a change in the rules, rather just the inclusion of data protection in the factors that influence the already used models of consumers' harm assessment.

Lande (2008) has a similar position. He explains how « *the ultimate purpose of the antitrust laws is to help ensure that the free market will bring to consumers everything they want from competition* » (p. 2), and that « *antitrust is actually about consumer choice* » (p. 2). Such a choice may take many forms and, among these, prices are just the most usual one: this is why, most of the times, competition authorities base their

⁶⁶ See for example: Swire (2007), Lande (2008), Stucke & Grunes (2015).

⁶⁷ Including the European Commission, as it showed in important competition assessment such as the *Facebook/WhatsApp* merger.

⁶⁸ US Supreme Court (1984), *NCAA v. Board of Regents*, 468 U.S. 85, §107: « *A restraint that has the effect of reducing the importance of consumer preference in setting price and output is not consistent with this fundamental goal of antitrust law* ».

⁶⁹ As explained by the OECD (2014), the EC recognizes only indirectly the interest of consumers, which is reflected in every branch of competition law.

⁷⁰ See for example *Been v. O.K. Industries, Inc.*, 495 F.3d 1217, 1232 (10th Cir. 2007); *Telecor Communications, Inc. v. Southwestern Bell Telephone Co.*, 305 F. 3d 1124, 1132 (2002); *Rebel Oil Co., Inc. v. Atlantic Richfield Co.*, 51 F.3d 1421 (1995).

assessments on the price dimension. However, the author shows that there exist sectors where factors other than prices are more relevant: for example, markets where price competition is absent due to regulation, markets where firms compete on the basis of the degree of research and development, and, ultimately, markets where competition consists also in the different level of privacy protection's commitment. While privacy is probably not a concern for a monopolist, in case of perfect competition a firm that fails to protect consumers' privacy would be certainly penalised, especially if it operates in an information-heavy sector. Therefore, also Lande believes that privacy may have crucial effects over competition, and that this aspect should be considered by competition authorities when assessing the degree of concentration of a market, especially when analysing the potential consequences of a merger between two data-intensive companies.

Stucke and Grune (2015) explain that a merger between two data-driven companies is likely to raise privacy concerns, as they would probably become able to lessen non-price competition, namely the degree of privacy protection accorded to consumers. They also hypothesize that data-driven monopolies may be able to implement exclusionary practices aimed at hampering innovative alternatives that would afford consumers greater privacy protection. Again, privacy is seen as an element strictly connected to competition issues.

Finally, Schepp and Wambach (2016) underline how privacy protection may give rise to competition issues when a company expressly crosses the limits accorded to data protection in order to extract more value and thus gain a competitive advantage over their rivals. Then, the authors agree upon the idea that privacy should be taken into account by antitrust authorities as an element of non-price competition. However, they also recognize that such a practice would incur some limits, such as the difficulty of measuring the potential reduction in privacy, and the problem that the decision about the optimal level of privacy should not be the task of a competition judge. They thus conclude that privacy issues should be addressed in competition proceedings, but that the safeguard of such rights should be implemented by privacy institutions.

3.4 Why Big Data is susceptible to raise competitive concerns

Author(s): Sophie Ciacciarelli and Giulia Rocchi

Data platforms as a source of market power

Big Data may act as a source of market power for multiple reasons.

First, Big Data may act as a *barrier to entry* to the digital market, when new entrants are not able to match the volume or quality of data processed by incumbent actors. This factor arises despite the non-rivalrous nature of data, for different reasons: the collection of data often requires significant initial investments, that can be compensated only by the existence of a large customer base; moreover, some digital services are characterised by high switching costs, that prevent consumers from changing provider. Obviously, a company can always buy third-party data from data brokers and have them processed externally, but the result may not be as good as with its own data⁷¹: not only may the scope of third-party data be limited in volume and variety, but also may third entities not be free to share all information they have due to privacy-related contractual clauses. Therefore, two other important aspects to be

⁷¹ See Autorité de la concurrence and Bundeskartellamt (2016).

considered when analysing data as an asset are their degree of availability and their diversity in value.

The risk for creating barriers to entry was recognised also by the US Department of Justice⁷²: in evaluating the lawfulness of the merger between *Bazaarvoice* and its rival *Power-reviews*, two digital platforms for rating and review, the Department stated that such a merger would have raised entry barriers due to « *networks effects from syndication, switching costs, moderation, analytics, and reputation* » (2014, p. 5), which are elements that typically derive from data processing.

An increase in entry barriers is a dangerous factor for competition, especially in highly-concentrated sectors, as it allows incumbents to avoid the entrance of small but promising competitors, and, if applicable, to charge higher prices. Moreover, the self-reinforcing structure of data caused by network effects, further strengthens the position of dominant actors, giving rise to so-called *positive feedback loops*⁷³ and making it really hard for new undertakings to enter the market and compete on a fair basis. Finally, as we have already seen, the data market is usually characterised by economies of scale and scope, which, even if they do not suffice alone to lead to a too concentrated market, they should be anyway considered when assessing an undertaking's market power.

Enhancement of market transparency caused by data

As noticed in the French and German competition authorities report⁷⁴, a higher use of digital data by companies usually leads to a higher degree of transparency in the relative market. In this case, transparency has an ambiguous effect over market's participants.

On the one side, market transparency may be beneficial for consumers, as it allows them to compare prices and characteristics of different goods and choose in a more informed way; it may also help potential entrants to find information about the market to enter it successfully.

But on the other side, transparency may in some ways also favour market concentration. For instance, the possibility to compare prices makes it easier for companies to collude, and to maintain collusion, as it becomes simpler to detect a deviation and there is thus less incentive to do it. Also when algorithms based on data are used to define prices, they may directly or indirectly reduce competition: if their functioning is similar, for example because they were created by the same provider, they may lead to similar results, smoothing prices to the detriment of consumers; otherwise, they can be directly programmed to follow the competitors' price strategies, leading to a form of tacit collusion. In such cases, it would prove very hard for competition authorities to detect unlawful practices.

Anticompetitive conducts related to data

⁷² Department of Justice (DOJ), Antitrust Division, Competitive Impact Statement, 13-cv-00133 WHO, dated 08.05.2014.

⁷³ OECD (2014), *supra* note 68.

⁷⁴ Autorité de la concurrence and Bundeskartellamt (2016).

Possible source of competitive issues is given by the anticompetitive practices effected by digital companies which try to increase their power by means of control over data.

Potentially anti-competitive practices are given by *exclusionary conducts*, which consist in limiting the access to data to competitors. For example, Facebook, in its legal terms⁷⁵, prohibits the collection of users' content or information using automated means without the social network's explicit permission. Graef (2015) explains that providers of online platforms may also « *rely on intellectual property and trade secret law to protect the data they have collected* » (2015, p. 480), and that « *a database as a whole may qualify for protection under the sui generis database right created by Article 7(1) of the Database Directive* » (2015, p. 481). In any case, companies are not legally bound to give competitors access to their database, except for some limited cases – e.g. when such data is essential to carry on a certain business, and it cannot be obtained otherwise –, but refusal to data access must never be discriminatory⁷⁶.

Exclusionary conducts may also include exclusive contracts. Newman (2013) mentions, as a potentially illegal practice related to data, Google's contractual clause which restricts the advertisers' ability to use competing advertising platforms: the possibility for the search engine to impose such a restriction derives from the unmatched size of its databases, thanks to which it is able to provide a very good service of personalized advertising at a high price, without worrying of competitors.

Another potentially exclusionary practice consists in the *cross-usage of data*, which refers to collecting data in a given market and then use them also in another market to gain a competitive advantage. However, one of the most common ways to increase market power is to expand its own database by *acquiring other companies*. Even if the acquired overtaking does not hold a relevant share of the market, the data it owns may give an important contribution when summed up with the data of the acquirer, endowing the new entity with a relevant amount of power. If the combination of data of the two entities becomes so large that it is hard to be matched by competitors, it will likely arise competition concerns, and even more so when the two merged entities belong to different levels of the market.

3.5 Two/multi-sided markets/platforms: a literature review

Author(s): Sophie Ciacciarelli and Giulia Rocchi

The economics literature of two-sided markets⁷⁷ encompasses a wide range of different businesses throughout the economy, which can explain the lack of agreement on a

⁷⁵ See: <https://www.facebook.com/legal/terms>

⁷⁶ See, for example, the case of Cegeidim: French Competition Authority, Decision n° 14-D-06, dated 08.07.2014.

⁷⁷ As highlighted by Hagiu & Wright (2011) as well as by Filistrucchi et al. (2012), since the economics literature defines a two-sided market as a market in which a firm acts as a two-sided platform, the terms “market” and “platform” appear to be quite interchangeable. At the same time, the authors underline that the analysis can be extended to “multi-sided platforms”, in the light of the fact that, broadly speaking, the platform connects two *or more* distinct groups/sides of users, challenging traditional linear business models: the platform mediates between two or more sets of agents, generating value for at least one of the sides, as well as for itself. A balanced interdependency (namely the presence of network effects) is essential to a platform's efficient functioning: without one side, the other won't participate, and vice versa. A prominent and classic example of a two-sided market is the payment card market, where a company sells both the use of a card to buyers and the use of terminal to merchants: both consumers' usage and merchants' acceptance are needed to give rise to a successful payment card network.

definition that takes account of such a variety. A review aimed to retrace the evolution of the topic across the years by considering those works that appear more relevant for an analysis, reveals that the literature on two-sided markets has expanded more and more, with a real boom in the last decade. This is reasonably due to the ever more central role in the global economy of IT industries that leverage multi-sided platforms' peculiarities and to the widespread diffusion in the personal use of the Internet, circumstances that has given rise to novel policy and strategy questions.

The first studies referring to two-sided markets, dating back to the mid-eighties, are clearly far apart from those of the present. Roth (1985) applies the idea of two-sided markets exclusively to some specific type of labour markets. The aim of the work is to analyse some of these markets, with a particular focus on the common and conflicting interests of their agents, and on their incentives. A definition of the "two-sided matching markets" expression is given in the first lines of the document: in particular, their "two-sidedness" derives from *«the fact that agents in such markets belong to one of two disjoint sets – e.g. firms or workers –»* (p. 75); the author explains how this concept does not exist in the case of commodity markets, where it is the market price which determines whether an agent is a buyer or a seller. Instead, *«the term 'matching' refers to the bilateral nature of exchange in these markets»* (p. 75); also in this case, a parallelism is made with commodity markets, where you don't have such a kind of exchange. The core analysis of this paper refers to the particular labour market in which graduating medical students seek internships and residencies in American hospitals: the matching platform consists in a central clearinghouse, which acts as an intermediary between students and hospitals. In this framework, each student makes a ranking of the different hospitals according to his preference, and vice versa; this information is collected by the clearinghouse, and each student is matched with a hospital by means of an algorithm.

While the medical literature describes this mechanism as optimal when every participant submits his true preferences, the author states that this is not true, due to *«some unusual properties of this market that relate to its two-sided matching structure»* (p. 76). As in the just mentioned paper, Demange and Gale (1985) also introduce the idea of two-sided markets by referring them to as "matching markets". To better explain the concept, different categories of markets included in such expression are mentioned in the text: for example, labour markets matching workers with jobs, academic markets assigning students to educational institutions, and marriage markets matching women with men.

In this work, the importance of two-sided markets stems from the fact that they allow to overcome two important problems that derive from the use of Walrasian equilibrium as a mechanism for making fair and efficient allocations. the presence of a matching market solves the problems of non-uniqueness and manipulability that arise in schemes involving agents that specify their supply and demand functions and, based on them, calculate competitive equilibria and make allocations. While the non-uniqueness problem implies the existence of several equilibria among which there is no way to choose which one to implement, that of manipulability refers to the situation where there is only one equilibrium, and an informed agent may be able to influence it. As we can see, the idea of two-sided markets in this paper is extremely wide; their own characteristics are not investigated deeply, and there is no reference to the several concepts that we tend to associate today with two-sided markets, such as network

externalities, economies of scale or multi-homing. The idea of this type of market is strictly linked to game theory, and serves just as a tool to develop the model proposed by the authors, while its features and functioning are not specified.

Although the interest towards two-sided markets see a moderate growth during the nineties, most of works keep referring to “two-sided *matching* markets”, and many of them concern game theory and labour markets. Nevertheless, among the most relevant works during the decade, Sasaki & Toda (1996) introduce the concept of network externalities in the two-sided matching markets field.

It's only from the beginning of the new millennium that a first boom related to the topic can be evidently noted. A substantial part of them deals with competition issues, probably because the specificity of competition policy in the context of two-sided markets started to be fully recognized only in this period. A popular work is the article by Rochet & Tirole (2003). This paper, which enlarge the types of markets considered in the concept of two-sided market (including platforms in industries such as software, portals, payment systems and the Internet), builds a model of competition among two-sided platforms, in order to determine prices and the consumer surplus, and compares the outcome with the case of an integrated monopolist. Jullien (2005) discusses on-line intermediation in two-sided markets, comparing the case of monopoly and the case of competition, while Ronson (2005) summarizes the literature about two-sided markets so far, with a focus on pricing principles, externalities, and competition. Varian (2006) makes an introduction to the economics of Internet search engines, where they are analysed by making reference to the classical theory of two-sided matching markets. Evans & Schmalensee (2007) analyse the structure of two-sided platforms and in particular their peculiar pricing structure, with its implication for Antitrust analysis. Rysman (2007) provides instead an overview of the empirical tools used in analysing Antitrust enforcement in two-sided markets. Vogelsang (2010) analyses entry deterrence in two-sided Internet markets from the point of view of a social network.

With regard to our fundamental focus, represented by centralized online markets based on data processing, in the case of two among the most representative firms operating in this sphere (namely Facebook and Google), the first works connected to the consequences of their two-sided nature appear only recently. In the case of Google, even the belonging of search engines to the two-sided markets category is a controversial issue in the literature. Macchiati (2010), after discussing how the crisis of the press is getting deeper as a consequence of the rapid transformation of the economic and contractual relationships among the various participants in the market for news caused by the increasing use of the Internet, briefly mentions the controversial debate around the actual “sidedness” of the search engines’ market, but without taking a clear stand. The author states instead the irrelevance, in spite of Google’s very high market share, of the presence of economies of scale that would prevent the coexistence of multiple players: a search engine could break even with a 7.5% share of market, thanks to procedures of horizontal differentiation (e.g. the accorded level of privacy, the efficiency of search algorithms etc.).

At a later stage the author highlights the difficulty in assessing Google’s relevant market and finally focuses on some competitive and regulatory issues, in particular with regard to the investigation for abuse of dominant position opened by the Italian Antitrust Authority in 2009 against the company, accused of automatically excluding from its

search results those publishers who refuse to let their editorial contents appear on Google News. The article closes with a call for non-intrusive and market-friendly regulations capable of soliciting forms of cooperation between Google, publishers and advertisers.

Burguet, Caminal & Ellman (2013) elaborate a model which investigates Google's intermediation role between consumers and two different but connected markets: that for offline product (represented by merchants) and that for online content (represented by content providers). Merchants have two ways for advertising their products and reach their potential customers: via sponsored links on Google's search results page, or via display ads on publishers' content pages. In the market for offline products, content providers and the search engine are therefore competitors: while consumers always need Google to find relevant outputs for their search queries, they may find products via display advertising on publishers' content websites instead of via Google.

Yet, the authors argue that the two modes of advertising are imperfect substitutes for merchants. Indeed, on the one hand Google has incentives to bias organic search results in order to weaken display advertising (e.g. showing publishers' websites devoid of advertising, like Wikipedia); on the other hand, Google's resulting share of merchant profits incentives it to distort sponsored search in favour of merchants with high margins. The effects of a merger between Google and an intermediary in the display advertising market on search reliability and consumer's welfare have been also investigated. An integration that involves only a fraction of publishers distorts Google's organic search in favour of its owned or affiliated partners. But even a fully monopolized integration, given the heterogeneity of effectiveness among publishers as platforms for display advertising, creates an incentive for Google to divert traffic towards the more effective ones.

Luchetta (2013) calls into question the two-sided nature of Google. The author identifies the two events that an intermediation platform needs to achieve for being legitimately included in a two-sided market: a single transaction must take place among two different groups of users, and the increasing size of each group of users must create equally increasing and reciprocal inter-side positive externalities. On the contrary, on Google's websites two different transactions take place: users want information, while advertisers want users' attention.

So, as stated by the scholar, «operations on both search and search advertising markets are a winning business strategy, not a structural feature» (Luchetta, p. 97). In addition, Google's markets do not show either reciprocal indirect or direct network externalities. Indeed, while the advertisers enjoy indirect positive network externalities from the number of searchers, in most cases the advertisements do not deliver additional benefits to the users. At the same time, Google searchers do not enjoy positive direct network externalities due to the size of their class. In fact, if it's true that a broad number of search users (and therefore of search queries) improves the quality of the search mechanism, it's also true that this is about "learning economies" rather than network externalities, because the quality of the search service depends on the number of past, and not future, searches⁷⁸.

⁷⁸ «Indeed, the same happens in the aircraft industry, which is the classic illustration for learning economies: Boeing and Airbus make better aircrafts at lower costs because have made more aircrafts in the past. Economists would never say, and have never said so far, that aircraft buyers enjoy network externalities; analogously, economist should not say that Google searchers do», Luchetta (2013), p. 98.

Google is therefore theorized by the author as a two-sided market *sui generis*, or better as the crucial component of two one-sided markets built on a CUNE⁷⁹ value chain. On the upstream market, Google acts as a particular kind of retailer that collects personal information both from other intermediaries and from end users. On the downstream market, advertisers buy personal information which are converted into targeted ads delivered to the "right" users. Advertisers enjoy Constant Unidirectional Network Externalities because, once the Cost per Click is fixed, they buy as many clicks as possible until their budget run out, as long as their expected profit per click is higher than the CPC. The author states that, framing Google in this diverse way, would provide a clear criterion for the definition of the relevant market, which becomes the degree of users' personal information profiling. As a consequence, rather than only on search queries or search-based advertisements, the dominance of Google should be assessed in relation to a new class of competitors, namely social networks.

Urso (2013) examines the conducts being contested in the proceedings for abuse of dominant market position undertaken against Google by the European Commission and the Federal Trade Commission. The author begins by chronologically ordering the events. He then systematises the prosecutions in four main lines of investigation. While the identification of Google's relevant market appears uncertain, quite unambiguous seems its belonging to the two-sided market category, although the author reports the existence of some different but isolated trains of thought.

Straightforward is the setting of a new business model, in which the free provision of services by an enterprise serves only to capture the public's attention and sell it to other companies in the form of advertising space. Nevertheless, the nature of the good/service offered by the search engine is informational rather than commercial. As a result, the scholar states that the manipulative conducts of which Google has been accused, being not based on any commercial behaviour capable of directly disturbing market dynamics, should not be under the jurisdiction of the Antitrust law, suggesting to rather refer to unfair competition and detractive behaviours regulation to protect competitors and to misleading commercial practices provisions to safeguard consumers.

Ratfliff & Rubinfeld (2014) focus on the Antitrust issues that have been raised against Google. Possible choices of relevant markets are discussed and, before doing so, Google's business model is identified and described as a two-sided platform that monetizes the attention of consumers attracted to the delivery of organic search results by selling adjacent advertising. Observing that organic search would not be a viable standalone business, the relevant market in which Google competes encompasses both sides of the platform. This argument is used to claim that the FairSearch's allegation, under which Google shapes its search results in ways that steer users to its own services by leveraging its power in a market for search, should presumably consider other implicated relevant markets in place of the one just mentioned (e.g. that of vertical search).

⁷⁹ *Constant Unidirectional Network Externalities* that flow from the numerosity of searchers to advertisers but not vice versa.

From a privacy perspective, a growing group of researchers has started to suggest the importance of a new factor in identifying the level of power in data-centric markets: as we have already seen, some authors (Swire 2007; Lande 2008; Stucke and Grune 2015; Schepp and Wambach 2016) identify the level of privacy protection as a potential competition factor. The idea is that a too high concentration of market power in the hands of a single platform may lead to a reduction in the degree of privacy accorded to users: in such context, the degree of privacy protection is seen as a further factor, besides price, which influences the degree of competition among firms and thus indirectly represents their degree of market power. Sturke & Grunes (2016) addresses for the first time the issue of Big Data, its relation to competition law and how it should be regarded by competition authorities. As explained in chapter 7 of Sturke & Grunes' book, a current limit of Antitrust authorities, both American and European, is their price-centric approach to competition policies.

In their merger guidelines, the US and EU competition authorities acknowledge the importance of non-price parameters of competition, such as quality and innovation. They recognize how an increase in market power can also be manifested in non-price terms and conditions that adversely affect customers, including reduced product quality, reduced product variety, reduced service, or diminished innovation (Sturke & Grunes, 2016, p. 108).

However, in the reality, «the antitrust analysis gravitates to whether the merger will likely give the parties the power to raise the product's or service's price above competitive levels» (p.109): almost all merger reviews take into account just price parameters, usually referring to the so-called SSNIP test. Also some quality parameters may be considered, but they are never recognized a primary role. As we have already stated, the two-sided characteristic of the main platforms dealing with Big Data makes prices a secondary factor among the determinants of the dynamics between the different sides of the platform. The authors (p. 117) mention as possible solution the use of a SSNDQ (Small but Significant Non-transitory Decline in Quality) model but, lacking a universal measure of quality due to its subjectivity, such a path seems today unfeasible.

4. DATA-DRIVEN VALUE CREATION MODELS: SELECTED INCUMBENT PLATFORMS' CASE STUDIES

4.1 Incumbent platform companies: a global economic and geographical overview

Author(s): Stefano Lucarelli and Giulia Rocchi

This section is intended to move the argumentative line we have followed so far on a less abstract level of reasoning. Since the entire online platform market cannot be the subject of an in-depth examination, for the purposes of the DECODE project we will direct our attention towards four of the most representative and dominant data-driven platforms at global level, which are also the most used within European Union Member States. Within the present paragraph, we will also explain the criteria we have considered for our choice. Each case study will be provided with an analysis of the business model and value creation model it runs, as well as of a review of the major competition and data protection-related problems - and of occurred or pending regulatory actions - it has faced or still raises.

Evans & Gawer (2016) represents the most relevant attempt to describe the global rise of platform enterprises and serves as a valuable starting point for our investigation. The work provides a picture framing how many large online platforms are operating around the globe, where they are located, and what business activities they are running.

With regard to platforms' business sectors (App Marketplaces and Manufacturing, e-Commerce/Marketplace, Enterprise Software, Fintech, Internet Search and Services, Internet Software and Manufacturing, Internet Software and Services, IoT Software and Manufacturing, Media, Search Add-Tech and Services, Social and Social/Messaging, Transportation, Travel), outcomes differ on the ground of the ranking approach applied. When sectors are ranked by number of companies, e-Commerce (e.g. Amazon) leads the list, immediately followed by Fintech and Internet Software and Services (e.g. Microsoft). When ranked by market capitalization, Fintech drops to the last place, Internet Software & Services take the place of e-Commerce, which shift to the second position, while ranked third are device manufacturers owning large developer networks and App Marketplaces (e.g. Apple). It is worth noting that workplace and healthcare sectors (and related platforms) are totally and quite surprisingly absent from the global survey, despite the amount of attention they have drawn in the last years. To explain that, authors have conjectured that *«inherent fragmentation by type of work and by geography may have caused a lack of scaling which has limited the potential of businesses operating in this space to achieve valuations of \$1 billion or more»* (Evans & Gawer 2016, p. 17).

The survey focus on both privately owned and publicly traded platforms⁸⁰ with a market valuation of at least \$1 billion. Consequently, a final list of 176 companies from 5 regions

⁸⁰ A *privately held company* is a business company owned either by non-governmental organizations or by a relatively small number of shareholders or company members which does not offer or trade its company stock (shares) to the general public on the stock market exchanges, but rather the company's stock is offered, owned and traded or exchanged privately. A *publicly traded company* is a corporation whose ownership is

and 22 countries, was presented: 82 in Asia (where China dominates with 64 platforms), 64 in North America (all based in the U.S. with the exception of a Canadian one), 27 in Europe (one third in the U.K.), 2 in Latin America (Argentina and Brazil) and 1 in Africa (South Africa). Looking beyond the regional level, the survey found that a quarter of the platforms have their head offices within the San Francisco Bay Area, while the second city with the highest concentration of platforms' headquarters in Beijing with a total of 30, followed respectively by Shanghai (15), and London and New York, with 8 platforms each. It is meaningful that Europe is characterized by a relatively small number of platforms headquarters: the range is from 2 to 5 just in the biggest cities, like Paris, Amsterdam and Berlin. Even though Asia has the largest number of platforms, the highest market capitalization is concentrated in North America: \$3.1 trillion, greatly overtaking Asian market capitalization (\$930 billion). European platforms' market capitalization is collectively \$181 billion. The global market capitalization overcomes \$4.3 trillion. The picture below shows how the companies' head offices are globally distributed.

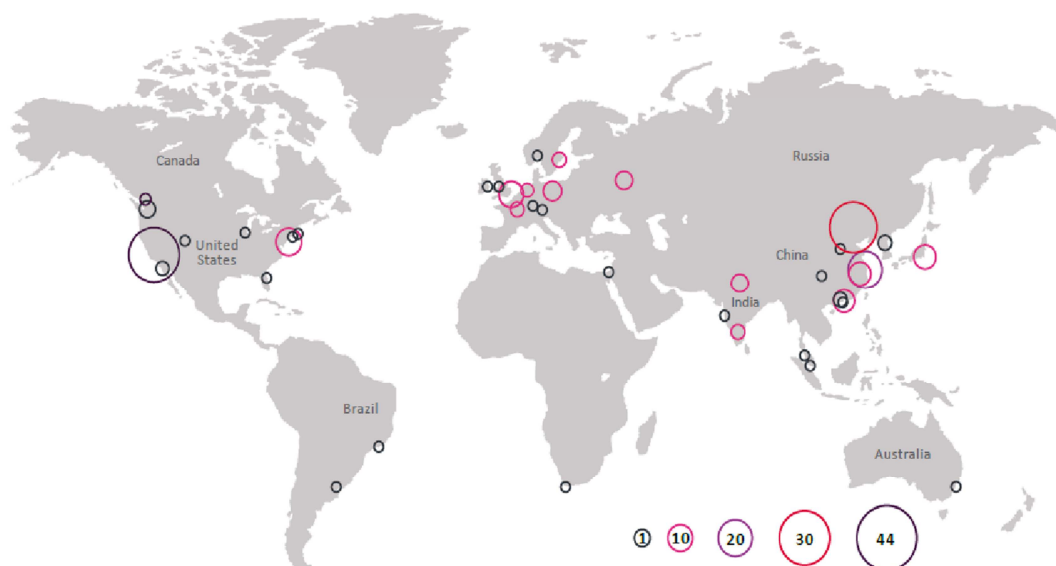


Fig. 4.1: Cities by number of company head offices
Source: Evans & Gawer (2016), p. 12

As shown in the Fig. 4.2, privately held companies are more in number (107) but have a collective market capitalization of just \$300 billion, against publicly-traded companies' value of \$3.9 trillion, despite they are significantly less (69, three-quarters of which based in Asia and North America).

Platforms in four main typologies on the basis of the business model they adopt:

1. Transaction Platforms are technologies, products or services that intermediate between different users, buyers, and suppliers, speeding up and facilitating exchange (e.g. Uber and Airbnb);

dispersed among the general public in many shares of stock which are freely traded on a stock exchange or in over the counter markets (source: Wikipedia, entries "Privately held company" and "Public company").

2. Innovation Platforms are ecosystems on the top of which other undertakings build complementary technologies, products or services (e.g. Microsoft and Oracle);
3. Integrated Platforms match characteristics of the two previous platforms (e.g. Google and Facebook);
4. Investment Platforms are firms that have developed a platform portfolio strategy (e.g. SoftBank and Naspers).

Almost all of the platforms included in the survey are transaction platforms and collect a total market cap of \$1.1 trillion. The integrated platforms category consists instead of 6 (but 1) public companies, which have a total market cap of \$2 trillion. Finally, innovation platforms are in number of 5 (4 of which private) and have a market cap of \$911 billion.

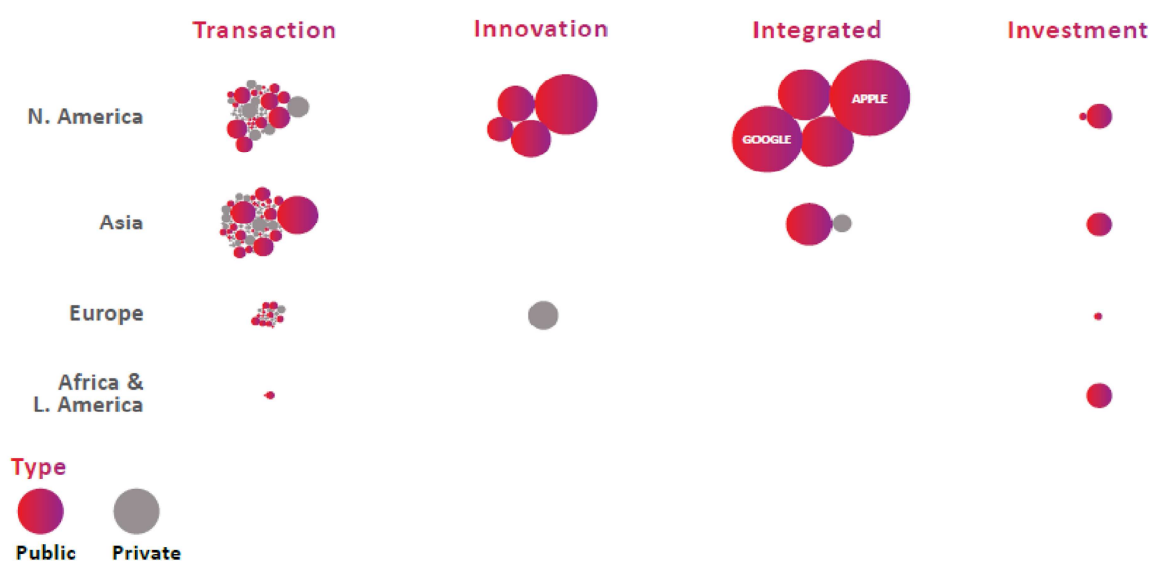


Fig. 4.2: Platform companies by type and regional distribution
 Source: Evans & Gawer (2016), p. 16

By analysing the top 25 online platforms rated on the basis of market capitalization, both in the case of publicly traded and privately-held platforms, the sum of the valuations of the first five companies visibly overcomes the valuation of all the remaining twenty companies taken together (see Fig. 4.3).

With regard to the top 5 publicly-traded companies, 4 are integrated platforms. However, there are deep differences within this subset: Google and Facebook are advertising platforms that *«laid the groundwork for extracting and using massive amounts of data»* (Srnicek 2017, p. 60), as we will see in the following paragraphs. Amazon was born as an e-Commerce platform, although by 2016 it has invested in data centres, robotic warehouse movers and massive computer systems. Differently from advertising platforms, Amazon Web Services was developed as an internal platform, to manage the increasingly complex logistics of the company. Instead, the business history of Apple and Microsoft shows two other specific case studies. During the '80s, the core aim of both companies was operating systems' commercialization. Particularly Apple focused on personal computers in the Macintosh line. When Steve Jobs rejoined the company in 1996, that mission evolved beyond personal computing into products like the iPod, iPhone, and iPad (Noren, 2013). Microsoft business strategy integrates instead the following 3 elements (Dudovskiy, 2017):

1. "Cloud-first, mobile-first": the company aims to achieve \$ 20 billion in commercial cloud in 2018;
2. Growing through mergers and acquisitions: the list of the most notable recent acquisitions includes Nokia Corporation's Devices and Services business for \$ 9.4 billion in 2014, Mojang Synergies AB (the Swedish video game developer of the Minecraft gaming franchise) for \$ 2.5 billion, and LinkedIn for \$ 196 per share in an all-cash transaction valued at \$ 26.2 billion in June 2016;
3. Focusing on Augmented and Virtual Reality.

Given the features of Apple, Microsoft and Amazon, we will consider only Google and Facebook as highly market capitalized data-driven platforms. Our choice is also confident with the pragmatic definition of Big Data presented in the first section of this deliverable, that showed the relevance of key players like Google and Facebook.

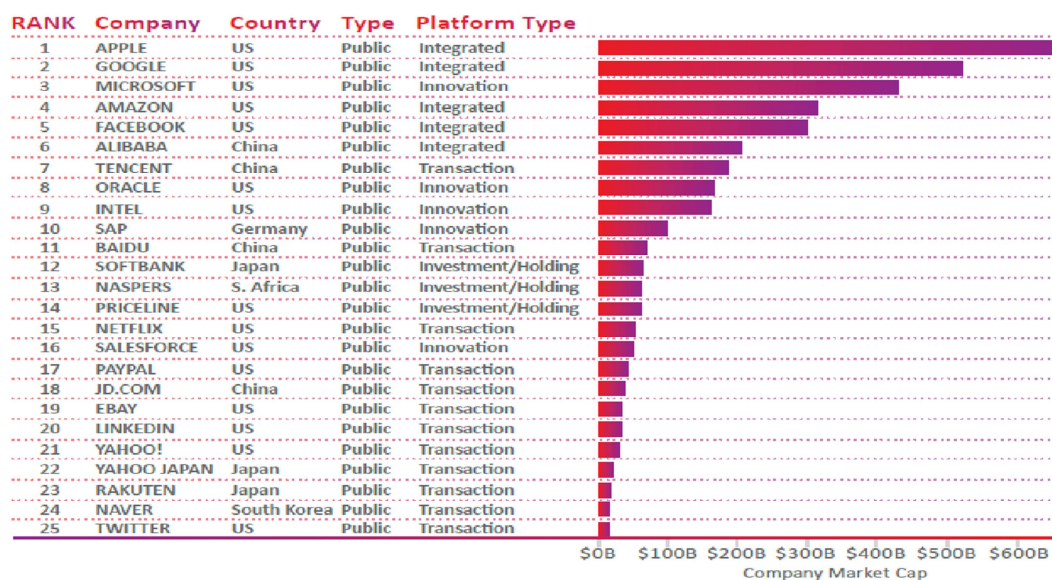


Fig. 4.3: Top 25 publicly traded platforms
Source: Evans & Gawer (2016), p. 24

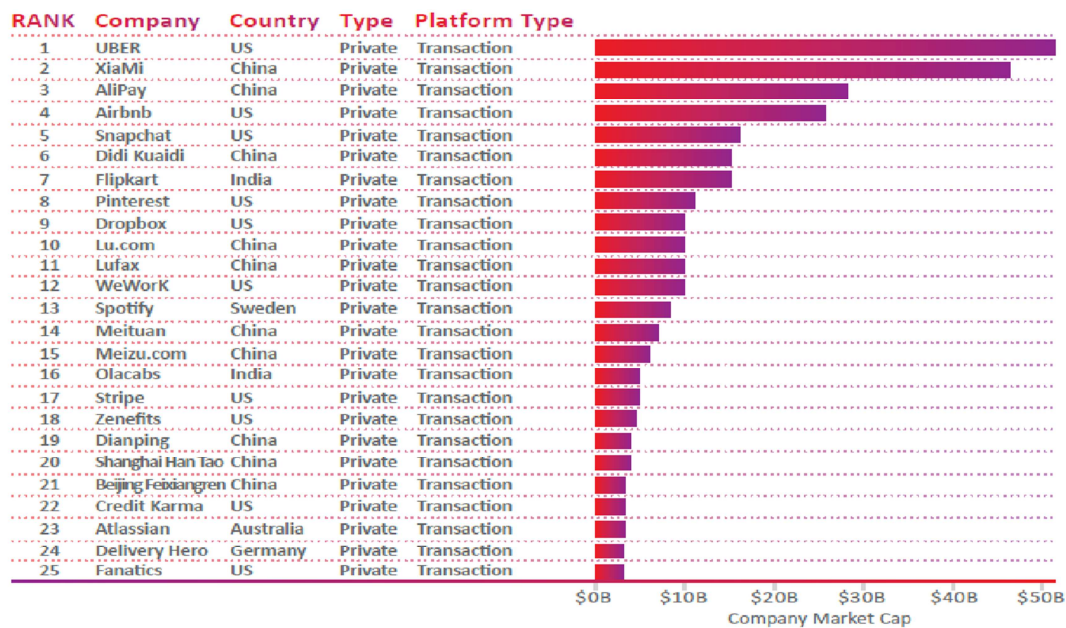


Fig. 4.4: Top 25 privately-held platforms
 Source: Evans and Gawer (2016), p. 25

Which are the most widely used online platforms in European countries? By considering the publicly traded platforms, we can stress that Facebook and Google represent the most successful ones; indeed, non-American companies are very marginal for European citizens. Google dominates the European search engine market, that in October 2017 presents the following shares: Google 92.01%, Bing 3.67%, Yandex RU 1.85%, Yahoo! 1.59%, DuckDuckGo 0.36%, Seznam 0.14% (source: Stat Counter Global Stats). Similarly, Facebook dominates the social media field in Europe: Facebook 79.54%, Pinterest 7.23%, Twitter 5.16%, YouTube 2.54%, Instagram 1.6%, Reddit 1.55%.

Regarding privately-held platforms, it's noticeable that their market capitalization is much lower than publicly traded platforms: the top 25 privately-held platforms have a market value nearly equal to one tenth of that of publicly traded platforms. In Europe, Uber and Airbnb are the most widespread U.S.-based privately-held transaction platforms.

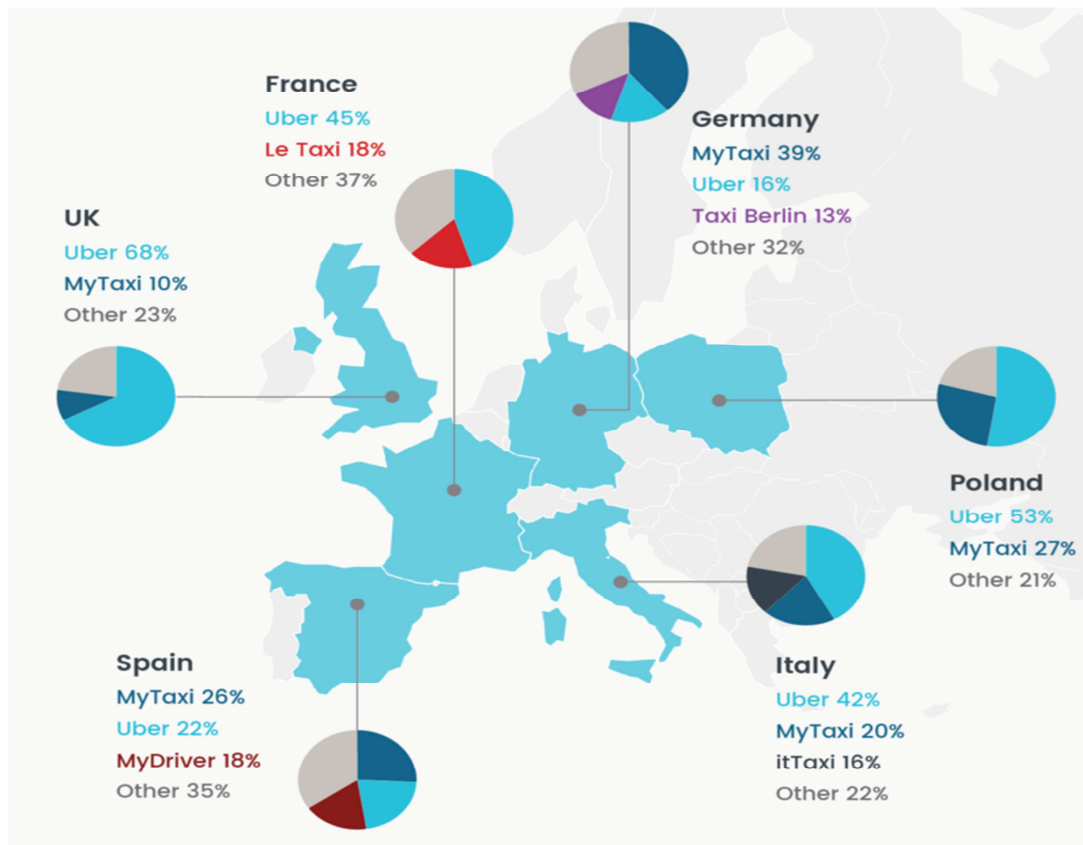


Fig. 4.5: Ride-Hailing Apps in Europe

Based on a census-representative survey of 10,632 people across the 28 EU countries completed in August 2017 By Dalia Research

(Source: <https://daliaresearch.com/blog-uber-fights-against-local-companies-europe/>)

A 2017 report⁸¹ commissioned by Airbnb to NERA Economic Consulting, whose main goal was to provide estimates of Airbnb's annual support to 200 of the local economies (in terms of output of goods and services, and jobs) in which Airbnb operated in 2016, highlights the magnitude of Airbnb's impact in Europe in comparison with the other considered global areas.

Region	Output Supported (Millions, 2016\$)	Job Supported (Annual Jobs)
Asia	\$ 9,000	170,000
Europe	\$ 31,000	260,000
Oceania	\$ 2,000	10,000
North America/Carribbean	\$ 3,000	50,000
South America	\$ 2,000	100,000

⁸¹ NERA Economic Consulting, *Airbnb's Global Support to Local Economies: Output and Employment*, March 2017,

http://www.nera.com/content/dam/nera/publications/2017/NERA_Airbnb_Report_2017_03_13_final_revised.pdf

United States	\$ 14,000	130,000
Other	\$ 1,000	10,000
Global	\$ 61,000	730,000

Tab.4.1: Airbnb Estimated 2016 Output and Employment Support (Global Regions)
Source: NERA Economic Consulting (2017, p. 10)

Following this line of reasoning, in section 4.2, 4.3, 4.4, and 4.5 we will present four case studies, which may be considered as benchmarks respectively in the context of integrated platforms and transaction platforms. Each section will describe their business model e value creation model, where those of Google and Facebook significantly diverge compared to Uber and Airbnb.

On the whole, different emerging risks can be stressed:

1. The impact and effects of online platform companies on competition in digital and non-digital data-related market;
2. The risks regarding users' data protection and privacy;
3. The impact on the labour conditions of new types of "gig" workers, especially in the context of transaction platforms which rely on new forms of exchange enabled by the "sharing economy";
4. The difficulties related to taxation.

Considered the specific aims of this deliverable, in the following paragraphs we will concentrate especially on the first two sets of problems.

However both the impact on the labour conditions and the difficulties related to taxation represent two relevant issues that will be deepen in the following deliverables of the T2.2 ("Data driven disruptive and commons based economic model")⁸².

4.2 Internet search services: the case of Google Search

Author: Giulia Rocchi

According to Internet Live Stats⁸³, Google currently answers over 61,000 search queries every second on average, over 3.5 billion per day and 1.2 trillion per year worldwide. It presently captures around an 80% share of web research⁸⁴ and its revenue amounted to \$ 89.5 billion for the fiscal year 2016 (Alphabet Annual Report, 2016, p. 21). The latter is almost totally made up by advertising revenue, which amounted to \$67.39 billion in 2016 (Alphabet Annual Report, 2016, p. 22).

⁸² Particularly in the next D2.4, indeed, as argued by Vercellone, Bria, Fumagalli, Gentilucci, Giuliani, Griziotti & Vattimo (2015, p. 22), "cognitive labour and knowledge are the common element that establish and render possible the social structure of any type of commons, independently of the nature of the goods, whether they be material or immaterial, subject to the constraints of scarcity or abundant."

⁸³ <http://www.internetlivestats.com/google-search-statistics/>

⁸⁴ <https://www.netmarketshare.com/search-engine-market-share.aspx?qprid=4&qpcustomd=0>

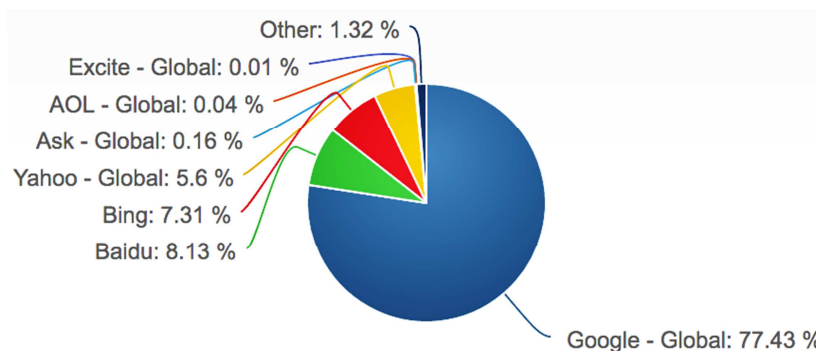


Fig.4.6: Desktop Search Engine Market Share as of April 2017
Source: NetMarketShare

4.2.1 General description

It is therefore indisputable that Google is the unreachable global leader both in the online search engine and in the search advertising markets. But how this occurred?

Its pre-eminence in the first of the sectors just mentioned is motivated by the core of Google's search engine, namely its algorithm, called PageRank (Laudadio Devine, 2008; Luchetta, 2012). It was developed in the mid-1990s by two Stanford University graduates, Larry Page and Sergey Brin (Vise & Malseed, 2006). It relies upon both text matching and websites' "reputation" to rank outcomes, thus providing more relevant, quality and unbiased organic results to user queries than the existing search engines at that time (Devine, 2008; Teece, 2010). And even nowadays, as shown by the statistics demonstrated above.

The explanation for its leading position in providing online advertising services will be soon explained. Just two years after its launch, Google was processing seven million searches per day but the founders still refused, due to their academic ethos, to sell advertising spaces, and were willing to profit from licensing their search engine to other firms⁸⁵. Nevertheless, in October 2000 they launched AdWords, «a self-service ad program enabling advertisers to register and activate an account online with a credit card, and allowing them to select the keywords they wanted their ads to be associated with» (Laudadio Devine, 2008, p.73), transforming a garage-based modest business in the Silicon Valley in one of the most profitable and powerful corporate giants in the world. It's relevant to note that AdWords was "inspired" by the GoTo.com model wholesale, where GoTo.com⁸⁶ was an Idealab spin off which first introduced in 1998 distinctly marked ads alongside organic search results and charged advertisers for these ads based on CPC (Cost - Per - Click) model, instead of the up till then adopted CPM (Cost - per - Mille) model (Lastowka, 2008; Evans, 2008; Laudadio Devine, 2008). The real innovation introduced by Google was the addition of a "Quality Score" in determining which advertiser would win the auction. The auction-based Cost-Per-Click model, as well as the Quality Score measures will be illustrated later on. However, providing users

⁸⁵ Even earlier «they decided to offer their PageRank technology and the search engine software for sale. They met with the owners of AltaVista, Excite and Yahoo! offering their technology for \$1 million. All of them rejected the offer to buy Google» (Vise & Malseed 2006, p. 2).

⁸⁶ In 2001 GoTo. Com renamed itself Overture and in 2003 was acquired by Yahoo!, becoming its ad search platform. Also in 2003, Yahoo! purchased Altavista, assimilating its database and technologies. These events didn't prevent Google's emergence and rapid consolidation. That same year, the latter displaced the competitor within the search-based advertising industry (Evans 2008, Visco Comandini 2013).

with sponsored search results that are as pertinent as their organic search results, was and is the factor that launched Google to the top of the heap, bringing the company more and more significant revenues. As a matter of fact, combining search with advertising monetizes what would be otherwise a merely technological effort. By leveraging over this mechanism, Google gradually went from being just an Internet search engine to being the so-called “bigG”.

The company created an Internet portal filled with any kind of features, such as email, applications, maps and storage products. It soon realized that most computing would quickly be on mobile devices: in February 2005, it acquired the startup Android Inc. and, by refining its mobile operating system, entered the mobile communications market⁸⁷. Most major smartphone manufacturers gradually adopted Android as their devices’ pre-installed OS. As shown by a statistic about the share of smartphone shipments worldwide⁸⁸, Google’s Android has been leading the global market since 2011, with an 80% market share reached in 2015, while Apple’s iOS is second, with 15%. The same applies to the global market share held by leading internet browsers, where Google Chrome placed itself on the top of the list with a score of around 47% at the end of 2015, against the 13% of its main competitor Safari⁸⁹. In 2015, the company was reorganized into the biggest subsidiary of a larger public holding company named Alphabet Inc (Rushe & Thielman, 2015). Anyhow, being the most profit done through the platform’s services and being the company formerly and still known as Google, we will keep naming it so even if, as has been seen, it is just a giant tech company’s subset. As a consequence of Alphabet’s creation, projects that were not part of Google’s core business were split into separate companies (the first group of the Fig. 4.7), each with its own CEO. These “moonshot” projects, labelled as “Other Bets”⁹⁰ businesses, cover a vast bundle of early-stage, futuristic, but promising pursuits in areas such as smart home technology, healthcare and urban planning. Even if they are still tiny⁹¹ compared to Google main products’ revenues (the second group of the Fig. 4.7), they show a revenue growth of 82% year over year⁹². Even though some of these investments seem to be substantially unrelated to Google’s advertising-focused revenue strategy, the 2014 purchase of Nest (a home automation company that designs and manufactures self-learning, sensor-driven smoke detectors, thermostats, and security systems) makes much more sense when it is understood as an extension of data recording, extraction and analysis to the IoT’s ecosystem, which is forecast to increase from an installed base of 15.4 billion devices in 2015 to 75.4 billion in 2025 (Lucero, 2016).

Google’s impressive and steady supremacy is guaranteed by its advertising revenues, in turn derived from the punctual capture of technological innovations. As of October 2015, Google had acquired around 184 companies, spending \$28 billion at least⁹³.

⁸⁷ See: <https://www.androidpit.com/the-sweet-history-of-android>.

⁸⁸ See: <https://www.statista.com/statistics/263453/global-market-share-held-by-smartphone-operating-systems>

⁸⁹ See: <https://www.statista.com/statistics/268254/market-share-of-internet-browsers-worldwide-since-2009/>

⁹⁰ «Alphabet is a collection of businesses – the largest of which, of course, is Google. It also includes businesses that are generally pretty far afield of our main Internet products such as Access, Calico, CapitalG, GV, Nest, Verily, Waymo, and X. We report all non-Google businesses collectively as Other Bets» See Alphabet Annual Report (2016), p. 1.

⁹¹ “Other bets” segment revenue was \$ 0,8 billion in 2016 versus Google segment’s \$ 89,5. Alphabet Annual Report (2016), p. 29.

⁹² Versus the 20% for the Google segment. *Ibidem*.

⁹³ <http://www.datasciencecentral.com/profiles/blogs/a-to-z-list-of-google-acquisitions-and-where-they-ended-up-within>

Many of Google's most well-known products came from the purchase of services and products originally developed and provided by other companies mostly based in the USA, and then either merged into Google's existing product lines or used "as they were" by simply renaming them. For instance, while Gmail results from the integration of four companies (Neotonic Software, Postini, reMail and Sparrow), Keyhole Inc. just became Google Earth in 2004 without significant variations⁹⁴.

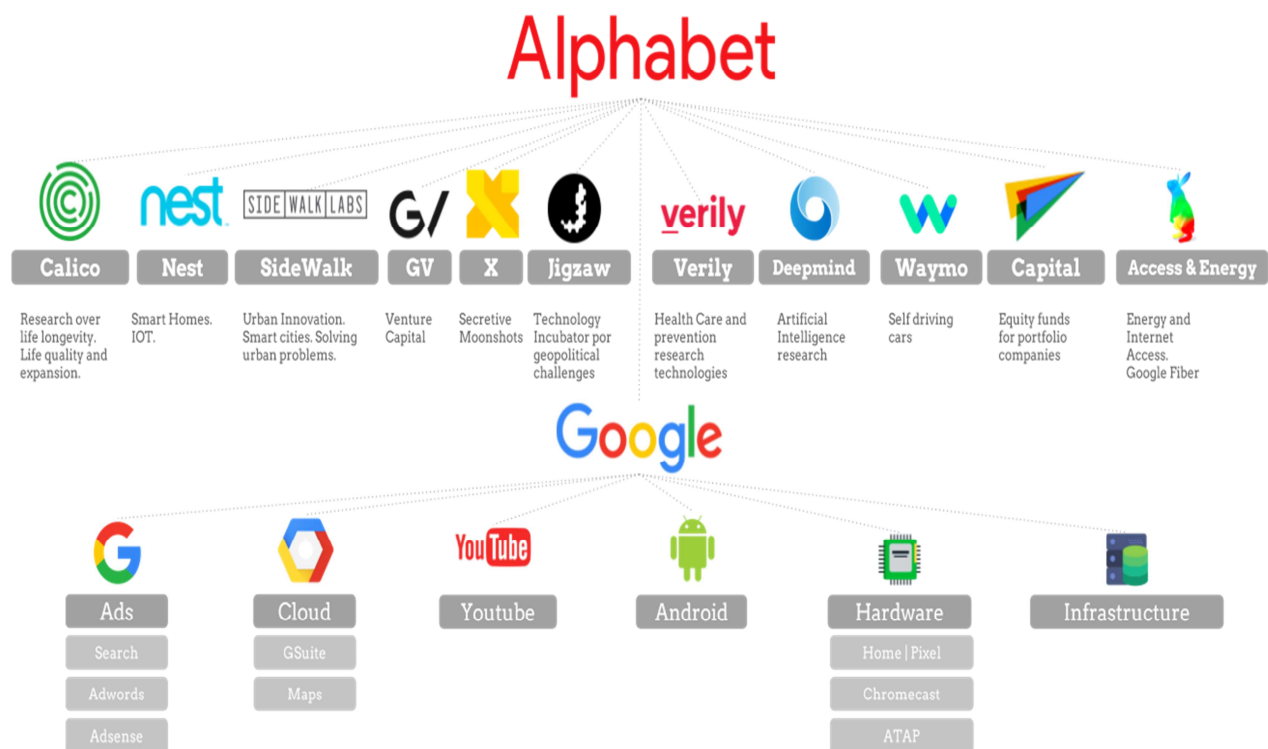


Fig. 4.7: Alphabet's corporate structure

Source: Wikimedia Commons. Link:

https://commons.wikimedia.org/wiki/File:Alphabet_Organizational_Chart.png

As explained by Laudadio Devine (2008) and Thépot (2012) among others, each of Google's acquisitions can be interpreted to expand its market share either by attracting more advertisers to AdWords (e.g. acquisition of DoubleClick) or by appealing more users to its search engine (e.g. acquisition of Writely, integrated into Google Docs in 2006). The latter, along with many other free products for the use of which the creation of a Google account is required, allows the company to build a fortified base of valuable registered users, whose preferences, searches, and data can be tracked more efficiently and to whom the company can serve more suited ads. A recent study (Englehardt and Narayanan, 2016) has demonstrated that Google is able to track users across nearly 80% of sites "Webwide", thanks to the ever-increasing number of its third-party domains.

⁹⁴ For an exhaustive list of companies that Google has acquired since 2001 see: https://my.infocaptor.com/dash/mt.php?pa=google_acquisitions_560b29a00783e . For a complete list of Google's services and products see: https://en.wikipedia.org/wiki/List_of_Google_products .

4.2.2 Google Search's business model

The nearly unique source of Google's wealth is, as said above, advertisement. It is worth to specify that ads can be shown both on desktop and mobile devices (including in-app ads).

A search query generates two different type of results: the list of websites as "organic" results, and the interrelated list of ads the advertisers have paid for, in a way that Google's search functionalities are swapped in exchange for user's "attention" to the ads (Thépot, 2012; Visco Comandini, 2013). AdWords⁹⁵ is a program which works on the basis of a real-time auction mechanism and allows advertisers to purchase CPC-based⁹⁶ advertising spots that target the ads in line with the keywords specified in users' search queries.

Ads will be eligible to appear on Google's Search Engine Results Pages (SERPs) in the form of sponsored results positioned beside, above, or below organic results, but also, for a more extended targeting, can be shown on sites that are part of the Google Search Network, a group of minor search engines that partner with Google. Ads are triggered by a proactive search keywords-based query, namely when users are proactively looking for a certain product/service with the intention to purchase it.

There is a second network, called Google Display Network⁹⁷, encompassing more than two million websites, videos, and apps that are registered in AdSense⁹⁸: publishers (namely writers, bloggers, designers, developers etc.) are remunerated to display Google AdWords ads on their websites and applications.

There are two ways for webmasters to participate in the AdSense program (Tuzhilin, 2006):

1) AdSense for Search (AFS)⁹⁹: publishers allow Google to place a Custom Search Engine¹⁰⁰ on their sites to provide users with web search within their site using a Google search box. When the users do keyword-based searches on the publisher's site, AdWords ads are exhibited, using the same methods adopted for ads shown on Google's SERPs¹⁰¹, but more customized to fit with the publisher's website topic.

2) AdSense for Content (AFC)¹⁰²: is the system that delivers in an automated way targeted AdWords ads to the publisher's webpage that the user is visiting (or the app he is using), taking into account, besides the described below targeting options, the financial values (the CPC factor) when choosing the best ads to put in the page/app.

⁹⁵ See AdWords Help: <https://support.google.com/adwords#topic=3119071>.

⁹⁶ The Cost-Per-Click is the predominant Internet advertising payment method, implying that an advertiser pays only when a visitor clicks on the ad; the CPM (Cost-Per-Mille) model stipulates instead that an advertiser pays per one thousand impressions (that is views), whereas the CPA (Cost-per-Action) model relies on the fulfilment of a certain conversion event, such as a product being purchased or a given form being filled. See Fain & Pedersen (2006) and Visco Comandini (2013).

⁹⁷ DoubleClick Ad Exchange is a big net of publisher sites which partners with the Display Network and represents an additional marketplace for advertisers, enlarging Google AdSense's clientele. As long as an advertiser have targeted the Display Network for its campaign, its ads can appear also on Ad Exchange publisher sites.

⁹⁸ See AdSense Help: <https://support.google.com/adsense/answer/3180977?hl>

⁹⁹ See AdSense Help: https://support.google.com/adsense/answer/9879?hl=en&ref_topic=1705820

¹⁰⁰ See AdSense Help: <https://support.google.com/adsense/answer/1055578>

¹⁰¹ «The AdSense program draws hosting sites into a closer relationship with Google. Because Google operates as an index, almost all small websites are partially dependent on Google for the traffic they receive» (Lastowka 2008, p. 1349).

¹⁰² See AdSense Help: <https://support.google.com/adsense/answer/17470?hl>

AdSense and AdWords' synergistic action¹⁰³ permits to deliver text and image/video-based ads tailored to the contents and the visitors of a certain website/app. To do this, different targeting options are available:

- Contextual targeting: it consists in determining the central theme of each Display Network webpage or URL by analysing the content of each (considering factors such as text, language, link and page structure etc.); when a keyword matches the webpage/app's central theme, the advertiser's ad is eligible to be shown automatically up on that webpage.
- Behavioural/Audience targeting: it enables advertisers to reach people based on their specific interests, starting from their Internet browsing history. The advertisers can select from a wide range of categories (sports, travel, fashion etc.) and ads will be exhibited to people who are likely to be interested.
- Location targeting: it allows ads to appear in the geographic location the advertiser chooses, distinguishing among different levels (countries, areas within a country, or radius around a location).
- Language targeting: it allows to set up the language of the customers to whom the ads are addressed.
- Demographic targeting: it grants advertisers to reach a specific set of potential customers who are likely to be within a particular age, range, parental status, gender, or household income.
- Device targeting: advertisers can choose the devices (desktop and laptop computers, iPhones and Android devices, or all of these) on which the ads will be shown.

Let us now see how the Pay-Per-Click auction-based keywords model underlies this complex trade's architecture (Tuzhilin, 2006; Varian 2007; Lastowka, 2008; Evans 2008; Visco Comandini, 2013). Google, just like many other search-ad platforms, use a "keyword bidding system" through which advertisers bid on keywords, chosen by specifying the maximum amount they are willing to be charged for each time an Internet user clicks on the ad that pops up along with search results. The bid price itself does not secure a higher slot because, being revenues' maximization the aim of Google, the company is aware that it may profit more from putting ads with lower CPC bids in higher slots, where these ads are more compatible with the user's search query. The paid listings that appear on a Results Page are ordered according to the AdRank for the candidate ads that is defined as

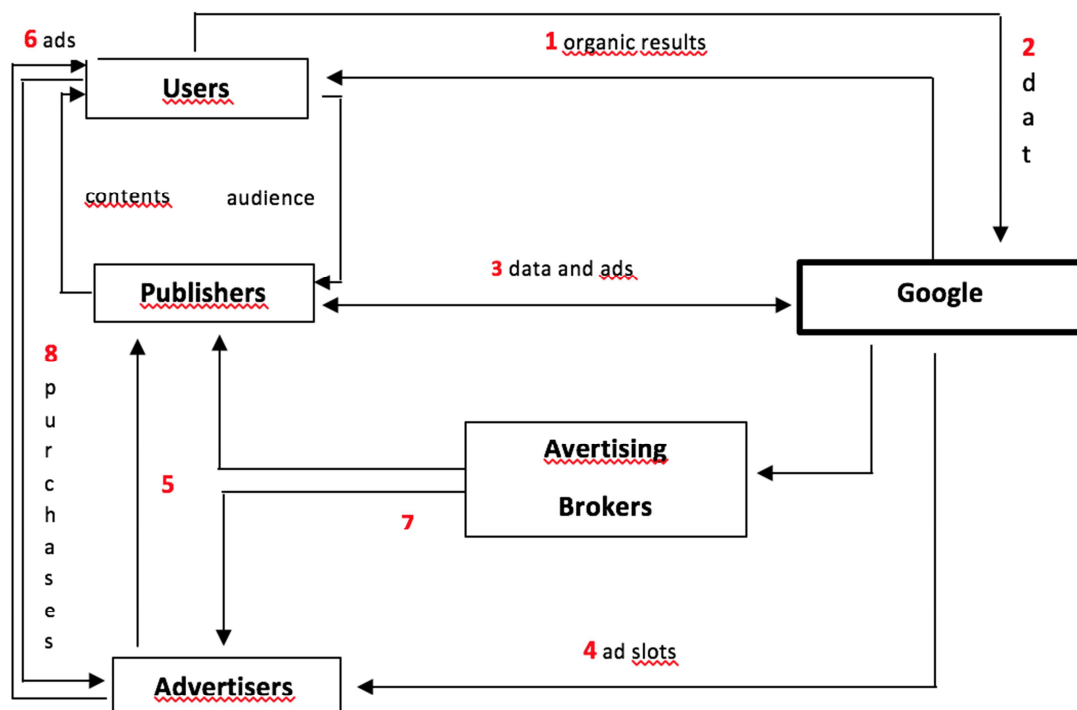
Ad Rank = CPC x Quality Score,

where Quality Score is an estimate of the quality of the advertiser's ads, keywords, and landing pages. One of its main determining factors is the click-through rate (CTR) on the ad, namely a ratio to gauge how well advertisers' keywords/ads pair are performing. The higher the CTR on the ad and the more the advertiser is willing to pay (CPC), the more advanced the position of its ad in the listing is. The auction process is repeated for every search on Google, and each one can have conceivably different results depending on the competition at that moment. The actual cost of the click is not known *a priori* by the advertiser because this depends on other bidders' gambles. Nonetheless, it is always lower than the maximal CPC indicated by the advertiser, who has a certain budget associated with a keyword, which is set for a specified time period and that decreases at each click. When (or if) the budget reaches zero, the ad stops

¹⁰³ «The AdSense program draws hosting sites into a closer relationship with Google. Because Google operates as an index, almost all small websites are partially dependent on Google for the traffic they receive». See Lastowka (2008) p. 1349.

showing until the end of the pre-arranged time period.

4.2.3 Value creation model: a simplified framework



1 Google delivers organic results to users; these results are shown on Google's SERPs and are relevantly ranked according to users' keywords-based search queries. The more the amount of queries is, the more data collected are, the better Google's algorithm becomes.

2 Users provide Google with a great amount of information, both by giving it away with full knowledge (e.g. by opening a Google account) and by being tracked while they are simply surfing on the Google's search engine or on sites that are part of the Google Search Network (e.g. when they watch a video on YouTube, use Google Maps, visit a website that uses Google advertising services or view and interact with Google's content). Google keeps innovating at an impressive rate, designing or buying companies, appealing services and products usable on various devices. This ever-increasing volume of information can be easily captured, processed and classified in order to group potential customers into segments on the basis of which proper marketing communications are conceived.

3 Google offers to publishers a program which, along with AdSense For Content, gives life to the Google Display Network. AdSense For Search enables website owners to place a Custom Search Engine on their sites to provide publishers with web search within their site, using a Google search box. This way, Google will show targeted AdWords ads within the site, while further expanding its collection of information by monitoring users' interactions and engagements with publishers' content.

4 Through AdWords, advertisers purchase advertising slots from Google, on the basis of a real-time auction mechanism. The ads will be displayed either on Google SERPs (**6**), or on publishers'/developers' websites/apps (**5**) who, being subscribed to AdSense For Content, are paid for hosting AdWords ads. Ads are highly tailored to visitors' relative

data in the latter case, while in the first are more modelled on what the user is looking for through the question addressed to the engine.

7 Advertising spaces can be purchased/offered either directly through AdWords/AdSense or indirectly through an advertising agency.

8 Advertisers/publishers/developers' expenses/revenues do not depend on the actual purchase of the advertised product or service, but on the clicks done on the ads by users, namely on the mere "attention" that they grant (by chance, mistake or real interest) to the ads.

4.2.4 Risks connected to the current value creation model

Even if it relies on stats that date back to 2014, the table below shows how impressively vast Google's Internet empire is and, consequently, how monopolies and breaches in users' data protection should be considered as tangled matters, to be faced in an integrated enforcement approach.

<p>#1 Internet User Tracking & Analytics</p> <ul style="list-style-type: none"> • Website Usage Tracking G's Analytics has ~98% site share with >15m sites tracking • #1 ICANN Top Level Domain Applicant • gTLDs 101: .search, .ads, .app, .docs, .map, .dev, .cloud, .web, .mail, .music, .movies, .book, .games, .blog, .shop, .med, .fly, etc. • #1 Internet Usage Rankings • Traffic exchange 60% of Internet devices & users exchange traffic daily with G's servers • Traffic involvement >50% of websites' traffic involves G's analytics, hosting & ads daily • Internet traffic volume ~25% of Internet's daily traffic is Google's • Internet dependency in 5 min Google outage Internet traffic declined 40% • #1 Public DNS Service Provider Ranking • Internet's Address Book handle >70b DNS address 	<p>#1 Video Distribution Rankings</p> <ul style="list-style-type: none"> • Viewers >1b total watching, 80% outside US, 40% watching on mobile • Online video viewing 6 hours per user monthly • Localized distribution 61 countries/languages • #1 Web Platform Rankings • Search ~1.3b users • Video distribution YouTube >1b users • Mobile Android OS >1b users • Location Maps >1b users • Browser Chrome ~1b users • Tracking/Analytics >15m websites • Advertising >2m display ad-websites • Apps Play offers >1.3m apps • Translation 80 languages, 97% world pop. • Email Gmail >425m users • #1 Digital Advertising 	<p>#1 Mobile Rankings</p> <ul style="list-style-type: none"> • Smart-phone shipments Android 85% share • User engagement Android users check their smart phones 125x daily • Tablet share for Android is 62% • Mobile OS usage share is 44.6% • Ad traffic share for Android is >50% • #1 Maps & Location Services Rankings • Map searches >1 billion daily • Websites 1.2m sites use Google Maps • Mapped roads mapped 28m miles of roads, 94% or 194 of 206 countries • Street View 5m miles in 50 countries • Home views 75% of global pop. can view their homes on Google Maps • Google traffic warnings in 600 cities • Most downloaded map app
---	---	---

<p>requests daily</p> <p>#1 Data Collection Rankings</p> <ul style="list-style-type: none"> • Index size >100 million gigabytes • URLs crawled ~60 trillion unique URLs • Collection partners display 2m websites • Collection partners maps 1.2m websites 	<p>Rankings</p> <ul style="list-style-type: none"> • Digital Ad revenues \$58b • Mobile ad rev share 50.4% share • Digital ad rev share 31.9% share • Traffic referrals to others 38% <p>#1 Search Rankings</p> <ul style="list-style-type: none"> • Mobile search 93.3% share • Overall search 89.5% share • Searches 6b searches, 2.1 trillion in 2013 	<p>on 54% of smart-phones</p> <p>#1 Corporate Rankings</p> <ul style="list-style-type: none"> • Corporate acquirer most acquisitions in world last 3-yrs • Data Centre Investment most data centre cap-ex ~\$28b 2006 – 2014 • Server points-of-presence 1400 in 140 or 68% of the world's countries USC
--	--	---

Tab. 4.2: Google's reach of influence and control over the World Wide Web
Source: Cleland (2014), p. 6.

Google's ability to collect, aggregate, integrate, analyse and leverage "all the world's information" is likely to give rise to potential harms which transcend competition and privacy concerns, broadening to other fundamental themes like those of transparency¹⁰⁴, intellectual property¹⁰⁵, public policy¹⁰⁶, and (last but not least) ethics¹⁰⁷. Acknowledging that the boundaries among these questions are often very feeble and interrelated to one another, an exhaustive review of Google's violations in all these areas falls nevertheless outside the scope of this work. Even the analysis of competition and privacy issues (which represent the two core themes around which reflections have been done so far) will be limited to a few, clamorous cases.

Competition

« (...) what I'm trying to do is to get a technology company that continues to scale its impact and aspirations in its every day. We're at a certain scale now, but I don't see any particular reason why we shouldn't be much bigger, more impactful than we are now. » (Larry Page, CEO of Alphabet Inc., Fortune¹⁰⁸, 11/12/12)

¹⁰⁴ See for instance, Vijayan (2013).

¹⁰⁵ See for instance, Savitz (2012).

¹⁰⁶ See for instance, Yang Lynn (2009).

¹⁰⁷ See for instance, Hern (2017)

¹⁰⁸ <http://fortune.com/2012/12/11/fortune-exclusive-larry-page-on-google/>

« (...) show me a company that failed because of litigation. I just don't see it. Companies fail because they do the wrong things or they aren't ambitious, not because of litigation or competition. » (Page, 2013)¹⁰⁹.

New online markets challenge both many of the assumptions of neoclassical economics and traditional antitrust assessments: network effects give big corporations competitive advantages that weaken the analysis of “equilibrium” prices¹¹⁰, marginal costs of production are generally close to zero, and information asymmetry deriving from the confluence of data processing power and supply of user data into few players' hands undermines the inference that (even substantial) monetary sanctions will correct problems of monopoly.

The Google/DoubleClick merger assessment

The EC has already scrutinised several instances concerning mergers in digital and non-digital data-related markets. So far, none of the decisions taken by the Commission considered the merged entity's database being as huge as to hamper competition, and for this and other reasons all the mergers concerned were allowed.

It should be noted that, in all these cases, the Commission follows its practice not to consider a data market among the relevant markets, because none of the companies concerned sells or purchases personal data. Actually, a debate concerning this topic started in 2007 in the US, during the assessment of one of these mergers – namely Google/DoubleClick –, when the former US Federal Trade Commissioner Pamela Jones Harbour suggested in a note¹¹¹ « to define a putative relevant product market comprising data that may be useful to advertisers and publishers who wish to engage in behavioural targeting » (p. 9). Indeed, she advocated that, if Google did not intend to combine its own datasets with those of DoubleClick, it would not have paid billions of dollars for its acquisition. According to her, the definition of a data relevant market would better reflect reality, considering the high value that companies extract from data. The acquisition of a major provider of display advertising by the leading Internet search provider was unsuccessfully opposed both by a group of American privacy watchdogs (Rotenberg, Ngo & Fitzgerald, 2007) (namely the Electronic Privacy Information Centre, the Centre for Digital Democracy, and the US Public Interest Research Group) on privacy grounds, and by rival companies (such as Microsoft and Yahoo) mainly on foreclosure's high risks basis.

¹⁰⁹Larry Page is CEO of Alphabet Inc., Wired, see <https://www.wired.com/2013/01/ff-qa-larry-page/2/>

¹¹⁰ As explained by Newman (2014). The ratio between click-throughs and the average CPC must generate revenue more than the platform's fixed cost. Google's overwhelming control of user data gives it the power of charging a far higher CPC to advertisers compared to its competitors', who will yield lower revenue but have nevertheless to cover much of the same fixed costs as Google for maintaining a competitive search advertising platform. This translates into a mathematical barrier to entry in the online advertising marketplace. In other words: « Google is really based on this. Users go where the information is, so people bring more information to us. Advertisers go where the users are, so we get more advertisers. We get more users because we have more advertisers because we can buy distribution on sites that understand that our search engine monetizes better. » See Rosenberg (2011).

¹¹¹ Dissenting Statement of Commissioner Pamela Jones Harbour, *Google/DoubleClick*, FTC file No. 071-0170, 20th December 2007, available at: https://www.ftc.gov/sites/default/files/documents/public_statements/statement-matter-google/doubleclick/071220harbour_0.pdf.

This decision¹¹² concerned the analysis, made in 2008, of the merger between Google, defined by the EC as “the most popular search engine”, and DoubleClick, a company mainly selling ad serving, management and reporting technology to online publishers, advertisers, and advertising agencies: both of them operate in the online targeted advertising industry, but they are not considered direct competitors¹¹³.

In its decision, the EC identified three relevant product markets: (i) provision of online advertising space, (ii) intermediation in online advertising, and (iii) provision of online display ad serving technology.

In assessing the potential causes for competition harm deriving from the merger, the Commission mentioned the risk of foreclosure, feared by third parties and based on the combinations of the two companies’ assets. Among these assets, a dominant role is played by the so-called “customer-provided-data” generated using the Internet, which, if put together, may « *allow the merged entity to achieve a position that could not be replicated by its integrated competitors* » (§359, p. 96), causing the latter to be marginalised and ultimately leading to higher prices for the services sold.

As a matter of fact, the EC acknowledged that the merged entity would likely be able to combine the data collections of the two companies, with the aim of reconstructing the behaviour of the users which use both platforms, by crossing information such as IP addresses and cookies ID, and use such information to better target advertisements to users. Actually, according to DoubleClick’s current contracts with advertisers, such a practice would not be allowed; however, even if such contracts’ provisions were modified or removed, and the data combination implemented, the EC advocated that it would be in any case unlikely that competitiveness « *would be enhanced in a way that would confer on the merged entity a competitive advantage that could not be matched by its competitors* » (§364, p. 96). This conclusion was made also by considering that similar information to the one gained by the merged entity is already available to some of its competitors, or could be obtained by buying data or targeting services from third parties.

Therefore, on the example of the Federal Trade Commission’s statement (which had given its blessing to the \$ 3.1 billion merger some months before¹¹⁴), the EC gave its free-conditions approval to the deal.

Abuse of dominant market position

In 2010 both the FTC and the EC opened infringement proceedings for supposed abuse of dominant position against the Mountain View company. While the former, after two

¹¹² European Commission (2008), “Google/DoubleClick”, Case No COMP/M.4731, dated 11/03/2008.

¹¹³ Objections to this argument as part of a comprehensively motivated attempt to block the transaction was given by the internetization strategist (and also administrator of [Googleopoly](#), “the largest compendium of antitrust accountability research focused on Google in the world”) Scott Cleland, in a paper published some months before the FTC *nulla hosta*. See Cleland (2012). According to the author, since they offer the same targeted online value proposition to the same corporate advertising clients/users/web sites (just employing different but easily “adaptable to each other” technologies), Google and DoubleClick would be direct competitors in the same market. He concludes by stating that the merger would be « *a standard horizontal merger to monopoly of competitive technology platforms in the targeted online advertising market, not a vertical merger of separate search and display markets* » (p. 30), giving rise to a resulting market power which would lessen competition and harm consumer, advertisers, and publishers.

¹¹⁴ Statement of FTC concerning *Google/DoubleClick*, File No. 071-0170, 20/12/07. Available at: <https://www.ftc.gov/news-events/press-releases/2007/12/federal-trade-commission-closes-googledoubleclick> .

years' enquiry¹¹⁵, declared no anticompetitive violations occurred¹¹⁶, in June 2017 the Commission fined Google 2.42 billion for breaching EU antitrust rules in the context of the first of the below listed allegations¹¹⁷.

After initial investigations, the European Commission informed Google of its preliminary conclusions, outlining in 2013 four areas where Google could have conducted abusive practices, partially overlapping FTC's concerns¹¹⁸:

1) *Specialised search*: Google would have favoured its own specialised search services (e.g., Google shopping and Google Places) within its organic search results, overshadowing or hiding competitors' results that are likely to be more relevant and effective to users' queries.

2) *Content usage*: Google would have used on its own specialised search services (e.g., Google News) original material drawn (without explicit consent) from the websites of its competitors, this way benefitting (at no charge) from their investments in the creation of original content.

3) *Exclusivity agreements with publishers for the provision of online search advertising on their web sites*: Google would have significantly narrowed publishers' possibility to display competitors' ads within their web sites, thereby diminishing both users' range of choice and competitors' access to them, hampering consequently the incentives for these latter to innovate.

4) *Contractual restrictions on the portability and management of online search advertising campaigns across Google's AdWords and competing platforms*: reversely, Google would have created artificial switching costs which inhibit advertisers' possibility to run their advertising campaign simultaneously on AdWords and competing online search advertising platforms.

In response to the Commission's concerns, Google proposed three sets of legally binding commitments¹¹⁹, which were followed by a market test launched in April 2015

¹¹⁵ Google was accused by some vertical websites: a) to conduct "search bias" practices, promoting its own vertical targeted properties within the organic results in response to users' purchase-oriented key-word based searches; b) to manipulate its search algorithms in order to make the previous point happen; c) to "scrape" (namely misappropriate) the third-party sites' content (in particular those of online newspapers) without their explicit consent, violating copyright; d) to restrict the ability of advertisers to "multi-home", namely to use multiple advertising platforms. While the first couple of allegations were not supported by sufficient evidence, Google voluntarily committed itself to put an end to c) and d) practices for a period of five years, and published a letter agreement (available at: <https://www.sec.gov/Archives/edgar/data/1288776/000119312513002492/d461279dex101.htm>) declaring that he would provide website owners with the option to opt out from Google's vertical search offerings, and agreed to remove AdWords' restrictions hampering advertisers' management of their campaigns across other ad platforms. Google had even recruited two "Chicago School" acclaimed antitrust experts to back up the lack of any legal or economic argument for a plausible antitrust case against Google. The complete report is available at: <https://www.criterioneconomics.com/docs/bork-sidak-google-search-oup.pdf>.

¹¹⁶ Statement of the FTC regarding *Google's Search Practices In the Matter of Google Inc.*, File Number 111-0163, 03/01/13. Available at:

https://www.ftc.gov/system/files/documents/public_statements/295971/130103googlesearchstmtofcomm.pdf.

¹¹⁷ See: http://europa.eu/rapid/press-release_MEMO-17-1785_en.htm.

¹¹⁸ An explanation for the fact that the FTC's investigation, unlike EC's, closed with no penalties, could be explained by the evidence that Bing and Yahoo, with a combined market share that is around 30%, represented at that time substantial alternative to Google in web search in the US (see: http://www.comscore.com/Insights/Press-Releases/2014/1/comScore-Releases-December-2013-US-Search-Engine-Rankings?cs_edgescape_cc=FR), contrary to European countries, where Google has been steadily holding market share above 90% for many years (see for instance search engine market share in Europe in 2007: <http://gs.statcounter.com/search-engine-market-share/all/europe/2007>).

¹¹⁹ See: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39740/39740_8608_5.pdf

aimed at assessing complainants' and other relevant stakeholders' feedback on these commitments. As additional improvements resulted to be required to adequately address Commission's concerns, the entire procedure (revised Google's commitments subjected to complainants' feedback) was repeated without satisfactory outcomes.

In 2015 the EC sent a Statement of Objections to Google related, as we have anticipated, to the first of its competition concerns, claiming that «*the company has abused its dominant position in the markets for general internet search services in the European Economic Area (EEA) by systematically favouring its own comparison shopping product in its general search results pages*», and adding that «*the sending of a Statement of Objections in relation to comparison shopping does not in any way prejudice the outcome of the Commission's investigation of the other three concerns*»¹²⁰. This seven years long enquiry closed with the above mentioned record financial penalty, which will be followed by a daily fine equal to 5% of Google's daily revenue in case of non-compliance, by 90 days, with any of EU's obligations. This the biggest fine the EU has ever imposed on a single company in an antitrust case and in response to which Google decided to lodge appeal (Boffey, 2017).

In 2015, the very same day of the Statement of Objections' transmission, the Commission announced the opening of formal investigations into another alleged infraction (separated from that involving Google's behaviour in Internet search) and regarding Android operating system¹²¹. A quick digression about this last point is needed. Android operating system is built upon Linux, the world's best-known and most-used "open source" kernel: Linux's code is free and available to the public to view, edit, and (for those with the pertinent skills) to contribute to, because is released under the GNU/GPL (General Public Licence). A fully functional operating system requires the kernel to be integrated with a set of additional software/components (programs, tools, and services).

Many Linux distributions are a combination of the Linux kernel and GNU free software. This is not the case of Android, which relies very little on GNU tools (and the ethics of the Free Software Movement¹²²). On the one hand, we find the Android Open Source Project (AOSP)¹²³, a platform where the core parts of Android's Linux-based source code is released and publicly available and it is used as the basis of smartphones and tablets throughout the world (the so-called "Android forks"); on the other hand, we find the source-closed Google Mobile Services (GSM)¹²⁴, which run on top of AOSP and constitutes the proprietary part of Android.

In 2016 the Commission issued a Statement of Objection¹²⁵ where, after acknowledging that Google, in most Member States, is holding market shares above 90% in two other markets beyond that of internet search services (namely, licensable smart mobile operating systems and app stores for the Android mobile operating system), declared that the company violated antitrust rules by carrying out the following three practices:

¹²⁰ See: [http://europa.eu/rapid/press-release MEMO-15-4781_en.htm](http://europa.eu/rapid/press-release_MEMO-15-4781_en.htm)

¹²¹ See: [http://europa.eu/rapid/press-release MEMO-15-4782_en.htm](http://europa.eu/rapid/press-release_MEMO-15-4782_en.htm)

¹²² See: <https://www.gnu.org/philosophy/free-software-intro.html> . For a more detailed discussion about free licences see: *D1.8 Legal frameworks for the digital commons and DECODE OS guidelines*.

¹²³ See: <http://www.androidauthority.com/android-linux-784964/>

¹²⁴ GSM include (inter alia) Gmail, Chrome, Google+, Google Maps, YouTube, Google Translate, and Google Docs. They are not part of AOSP and they are only available through a licence with Google.

¹²⁵ See: [http://europa.eu/rapid/press-release IP-16-1492_en.htm](http://europa.eu/rapid/press-release_IP-16-1492_en.htm)

1) *Licensing of Google's proprietary apps*: Google would have contractually made the licensing of its Play Store (app) and Google Chrome (browser) on devices using the Android operating system conditional on Google Search (engine) being pre-installed as default search service, thus lessening the incentives of manufacturers and consumers to pre-install competing app stores and browsers on the one hand, and reducing motivations of consumers to download such alternative app stores and browsers on the other hand.

2) *Anti-fragmentation agreements*: Google would have prevented manufacturers from selling mobile devices based on competing (and potentially more innovative) Android forks.

3) *Exclusivity*: Google would have granted financial incentives to some of the largest smart devices' producers and mobile network operators for the purpose of making them pre-install Google Search on their smartphones and tablets.

The Commission agreed to extend Alphabet Inc.'s Google deadline, which was scheduled for July 27th 2016, to respond to EU charges. On 10th November Google outlined its counter-argument in a long blog post and video (Walker, 2016), persuading EU officials to set up a panel of experts in order to re-examine conclusions and obtain a second opinion.

The case has therefore not yet been solved, as well as the third¹²⁶ and (so far) last antitrust charge against Google, regarding the third of the above discussed EC's concerns, namely that about presumed restrictions imposed to certain third party websites part of "AdSense for Search" network and using Google search box within their sites, to display search advertisements other than Google's ones.

Google would have therefore prevented existing competitors from growing in the area of online search advertising by imposing the following conditions:

1) *Exclusivity*: Google would have required third party websites not to source search ads from its competitors.

2) *Premium placement of a minimum number of Google search ads*: Google would have required to show a minimum number of Google-powered ads, reserving them the most noticeable space and demeaning competitors-powered ads.

3) *Right to authorise competing ads*: Google would have required third parties to receive its approval before amending the display of competing search ads.

Both these pending lawsuits will be likely to conclude with punitive measures similar (or even more pricey) to that imposed in the comparison shopping case. Against Google's defenders, who state that «a "successful prosecution" of Google for its search practices would necessitate regulation of search algorithms and product improvements, which would retard the current pace of innovation in Internet search that has created enormous gains in consumer welfare» (Bork and Sidak 2012, p. 700), we believe that effective antitrust intervention by governments would not take only the form of attempts aimed at inhibiting Google's illegal actions or collusions, but rather - and in absence of forward looking *ex ante* intervention in the early stages of the formation of its dominance - through scaling down Google's (and other dominant platforms') role in the international legal order, which is getting ever increasingly and frighteningly

¹²⁶ See: http://europa.eu/rapid/press-release_IP-16-2532_en.htm

resemble to that of sovereign states. Reducing platforms' strength to further collect data on users and empowering consumers' control over their data are not forms of censorship or interference with "innovation" breakthrough, but rather integral interventions within a regulatory pattern which places the preservation of the public interest at the very core of its political and ethical agenda.

Privacy

« We know where you are. We know where you've been. We can more or less know what you're thinking about. » (Eric Schmidt, Executive Chairman of Alphabet Inc., the Atlantic, 01/10/2010¹²⁷)

« Technology is not really about hardware and software any more. (...) It's really about the mining and use of this enormous volume of data (...) in order to make the world a better place. » (Eric Schmidt, Executive Chairman of Alphabet Inc., MIT News, 15/11/11¹²⁸)

Privacy protection is strongly intertwined with the technological advancements that enable new forms of interactions as we progressively integrate them into our daily lives, those companies that permit and often misuse these improvements in order to make more and more profits by exploiting users' increasingly scattered streams of data, and government and law enforcement agencies that can legally request these companies to hand over the information they own¹²⁹ about billions of people around the world (even if experiences of resistance to governmental mandates has grown in number, particularly after Snowden's revelations).

Nevertheless, privacy is a qualified personal and fundamental human right, as enshrined in Article 12 of the Declaration of Human Rights, which claims that *«no one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation»*. The privacy of an individual is directly implicated by the collection, use, and dissemination of personal information. Users depend on stated privacy policies to inform themselves and make decisions about potential harms, particularly when data are shared with not directly known third parties. Here below we will present some among a long list of privacy infringements' episodes Google has perpetrated over the years.

In 2004, soon after the launch of the web-mail service Gmail (at that time able to offer a storage capacity five hundred times larger than Hotmail's and Yahoo!'s), thirty-one privacy and civil liberties groups signed an open letter to the firm (Miller, 2005), urging it to suspend the practice of scanning all users' incoming and outgoing e-mail (included non-subscribers' ones) in order to extract content to be used for targeting them with personalized ads within the service itself.

¹²⁷ See:

<https://www.theatlantic.com/technology/archive/2010/10/googles-ceo-the-laws-are-written-by-lobbyists/63908/>

¹²⁸ See: <http://news.mit.edu/2011/schmidt-event-1115>

¹²⁹ As regards to Google, see: <https://transparencyreport.google.com/user-data/overview> ; as regards to Facebook, see: <https://govtrequests.facebook.com/> .

More than a decade later, Google announced¹³⁰ to abandon this longstanding habit, aligning the privacy policy adopted for 3 million paying corporate customers of its G suite's Gmail (already not used as input for ads personalization) to Gmail's free consumer version, which has more than 1.2 billion users. The firm will continue to serve ads on Gmail but the information needed to customize them will be mined from the other hundreds of Google services. It is then surely odd to still read in the last Google's Privacy Policy updated version¹³¹ the following declaration: «*Our automated systems analyse your content (including emails) to provide you personally relevant product features, such as customized search results, tailored advertising, and spam and malware detection*».

In 2010 Google admitted¹³² he had been accidentally recording payload data (namely fragments of the "content" of the information sent and received over the Internet, such as URLs, files, email bodies, instant messages, etc.) from open Wi-Fi networks through the Street View cars for three years, since the introduction of the service in 2007, featured in Google Maps and Google Earth. The discovery resulted from a data audit demanded by Hamburg's data protection authority and was followed by the complaints of the other twenty countries covered at that time by the service. Google declared that, given the concerns raised, he would have interrupted the collection of Wi-Fi network data entirely, SSID (the Wi-Fi identification name) and MAC addresses (the unique identifiers of a network adapter) included.

In return, he started relying on Android smartphones to get the information. In 2011, security researchers discovered that both Apple's iPhone (Allan, 2011)¹³³ and Google's Android smartphones (Arthur, 2011) keep a hidden unencrypted and unprotected file which tracks users' GPS coordinates and nearby Wi-Fi access points every few seconds and send the information, along with the device's unique identifier IP, to parent companies several times per hour.

In 2012 Google paid \$ 22.5 million civil penalty to resolve Federal Trade Commission charges¹³⁴ that Google placed advertising tracking cookies on the computers of Safari's users who visited sites belonging to Google's DoubleClick advertising network, in fact eluding the browser's default cookie-blocking configuration and deceiving meanwhile its privacy commitments to consumers.

Similarly, in 2013 the company paid \$ 8.5 million (McGee, 2013) to settle a three-year-old class action dispute that asserted Google disregarded users' privacy by revealing their search queries (which could have contained personal information) to operators of websites the users visited.

The same year, privacy advocate Simon Davies, founder of the influential watchdog group Privacy International¹³⁵, formulated a complaint about Google's renovated terms

¹³⁰ See: <https://www.blog.google/products/gmail/g-suite-gains-traction-in-the-enterprise-g-suites-gmail-and-consumer-gmail-to-more-closely-align/> .

¹³¹ See: <https://www.google.com/intl/en/policies/privacy/> .

¹³² See: <https://googleblog.blogspot.fr/2010/05/wifi-data-collection-update.html> .

¹³³ According to the researcher Alex Levinson, this discovery (Allan, 2011) would have actually been not new, having being described by some colleagues and himself in an academic paper written in 2010. For further information, see: <https://www.computer.org/csdl/proceedings/hicss/2011/4282/00/10-04-06-abs.html> .

¹³⁴ See: <https://www.ftc.gov/news-events/press-releases/2012/08/google-will-pay-225-million-settle-ftc-charges-it-misrepresented>

¹³⁵ See: <https://www.privacyinternational.org/> .

of service (Davies, 2013)¹³⁶ and lodged it with national Data Protection Commissioners in fourteen European countries, requesting investigations primarily focused on Google's new "Shared Endorsements" policy. "Shared Endorsements" are personal endorsements (equipped with users' accounts' profiles name and photos) published alongside the firm's advertised products across the Internet and constructed on the basis of the reviews, posts, and recommendations that users have made on Google+ or other Google services. In Davies' own words, this means that *«if a user follows a car manufacturer on Google Plus or gives a music artist four stars on the Google Play music service, for example, that user's name, photo and endorsement could show up in ads for that car or artist»* (p. 1).

In a lapse which went from January 2012 to September 2014 (Beck, 2014)¹³⁷ (when users were provided of a "no thanks" button), in order to create an account for whatever Google's product, users was compulsory required to create also a Gmail account and to join Google+. The company triangulated in this way the exploitation of users' data by requesting them *«to create accounts that (were) content-scanned, by merging their data throughout the Google ecosystem and then by linking personal preferences, interactions, associations and views to its advertising network»* (p. 2).

This news must be framed in a broader context of transformations in Google's terms of service, which took place on 1st March 2012¹³⁸ and consisted in replacing the then existing 60 different product-specific privacy policies with one single all-encompassing policy covering the collection of personal data across all its hundreds of services. Google's move, which was anticipated by a one-month advertising campaign to inform its users, immediately raised concerns among European DPAs and the French one (the Commission Nationale de l'Informatique et des Libertés - CNIL) was invited by the Article 29 Working Party¹³⁹ to lead an in-depth investigation¹⁴⁰ to assess the compliance of Google's new privacy policy with the European Data Protection legislation, asking the company to delay the announced change until the analysis had been completed. Despite this recommendation, Google went ahead with its one-size-fits-all" program.

The findings were made publicly available in a report divulged in October 2012¹⁴¹ nearly simultaneously with a separate letter¹⁴² written on behalf of some Asia Pacific Privacy authorities endorsing the same conclusions. The findings have shown that, in breach of

¹³⁶ The new policy came into effect on 11/11/13. See: <https://www.google.com/intl/en/policies/terms/changes/>

¹³⁷ Nevertheless, in Google's 2017 Privacy Policy web page you read: *«Depending on your account settings, your activity on other sites and apps may be associated with your personal information in order to improve Google's services and the ads delivered by Google»*.

¹³⁸ See: <https://googleblog.blogspot.it/2012/02/googles-new-privacy-policy.html>

¹³⁹ The "Article 29 Working Party" is the short name of the Data Protection Working Party established by Article 29 of Directive 95/46/EC. It provides the European Commission with independent advice on data protection matters and helps in the development of harmonised policies for data protection in the EU Member States.

¹⁴⁰ This purpose was expressed in a letter addressed to Google chief executive Larry Page on 27th February 2012. See: https://www.cnil.fr/sites/default/files/typo/document/Courrier_Google_CE121115_27-02-2012-EN.pdf

¹⁴¹ *ARTICLE 29 Data Protection Working Party*, Brussels, 16/10/12. Available at: http://ec.europa.eu/justice/data-protection/article-29/documentation/other-document/files/2012/20121016_letter_to_google_en.pdf . See also the Appendix, available at: http://ec.europa.eu/justice/data-protection/article-29/documentation/other-document/files/2012/20121016_google_privacy_policy_recommendations_cnil_en.pdf

¹⁴² See: https://www.cnil.fr/sites/default/files/typo/document/APPA_SUPPORT_LETTER-Article_29_Letter.pdf

the purpose limitation principle set out in Article 6 (1) (b) of the Directive 95/46/EC¹⁴³ and of the fair information requirements set out in Article 10 and 11 of the same Directive, Google has provided his users (including passive users, namely those devoid of a Google account) with insufficient and opaque information about the categories of data Google services process, the extent of Google’s actual processing activities, and the purpose these data are processed for.

Additionally, regarding the lawfulness of the combination of data, the assessment found that, in breach of Article 7 of the Directive in question, only four out of the eight purposes for which Google combine data relied on the unambiguous consent of the user. Finally, Google has not set any limit to the combination of data, neither has provided clear and extensive tools allowing its users to control it, nor it has specified the retention period for the personal data it processes. In April 2013, in response to Google’s refusal to implement any compliance measure in reply to the above cited findings (and the related recommended remedies), six DTAs from France, Germany, Italy, the Netherlands, Spain and the UK announced that they would take consolidated action against Google in order to examine its privacy policy’s compliance with their respective legislations. In short: Spain fined the company with the maximum fine of € 900.000 in 2013 (Yan, 2013), quickly followed by French CNIL’s € 150.000 fine (Bodoni, 2014), while the authorities in the other four countries took steps to compel Google to modify its privacy policy.

In 2014, the above mentioned Working Party sent a follow-up document¹⁴⁴, accompanied by guidelines containing a common list of measures to be implemented, aimed at reminding Google of its pending obligations. Like the previous one, this document does not discriminate between data already held by Google when the new policy came into force and data collected afterwards, shifting the focus on transparency and the reinforcement of user control tools. In doing so, it appears to substitute Google’s responsibilities to plainly notify its users about the way in which their data is collected, processed and used, with users’ own liability to self-inform and understand Google’s complex processing activities. On the other hand, and differently from its 2012 namesake, this document does not address the issue of whether or not Google has the right to merge data across different services, also in the light of the purpose limitation principle.

Even if Google did gradually begin to add more information about technical terms in the form of a multi-layered approach (from a “general policy” layer, to a “service specific policy” one, to end up with an “in product notice”) to make users more aware about the use of their data within Google’s environment, within its privacy policy in the dedicated web page, which has undergone sixteen revisions since the first updating made in 2012¹⁴⁵, the following statements can be read: « *If you have a Google Account, we may display your Profile name, Profile photo, and actions you take on*

¹⁴³ Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data. Available at:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31995L0046:en:HTML>

¹⁴⁴ ARTICLE 29 Data Protection Working Party, Brussels, 23/09/14. Available at: http://ec.europa.eu/justice/data-protection/article-29/documentation/other-document/files/2014/20140923_letter_on_google_privacy_policy.pdf .

See also the Appendix, available at: http://ec.europa.eu/justice/data-protection/article-29/documentation/other-document/files/2014/20140923_letter_on_google_privacy_policy_appendix.pdf .

¹⁴⁵ See: <https://www.google.com/intl/en/policies/privacy/archive/> .

Google or on third-party applications connected to your Google Account (...) in our services, including displaying in ads and other commercial contexts». «We may combine personal information from one service with information, including personal information, from other Google services – for example to make it easier to share things with people you know». «Whenever you use our services, we aim to provide you with access to your personal information. If that information is wrong, we strive to give you ways to update it quickly or to delete it – unless we have to keep that information for legitimate business or legal purposes».

If we bear in mind that « *the Google policy on a lot of things is to get right up to the creepy line and not cross it*» (Saint & Schmidt, 2010), the recent lawsuit¹⁴⁶ that an unnamed Google product manager has filed in California Superior Court in San Francisco against the company for its confidentiality policies, which allegedly violate California labour laws, should not be much surprising.

It seems that, when it comes to its own privacy, Google's conduct is more than rigorous. The plaintiff has claimed that he has been falsely blamed by Brian Katz (Google's Director of Global Investigations, Intelligence and Protective Services) for leaking certain information to the press. Much of the case is focused on the Confidentiality Agreement that employees ("Googlers") have to sign, and where the notion of "confidential information" is rather vast, since it consists of «*any information in any form that relates to Google or Google's business that is not generally known, including employee data*». Summing up, the Confidentiality Agreement requires Googlers to prevent any unauthorized use or disclosure of Google's confidential information or Google's pertaining work, both during and after their employment, and with no time or geographic limitation: the skills, knowledge, business practices, and the global experience they have obtained at Google is therefore prevented to be used afterwards. In case of failure to abide this rule, disciplinary actions (including lawsuits) may be pursued. Therefore, this agreement «*unlawfully restrains trade by prohibiting the use of information that is not confidential as a matter of law*». Separately from the agreement, Google requires its employees to comply with its policies, guidelines, and practices.

The Code of Conduct Policy states, among other instructions, that «*it is also a bad idea to post your opinions or information about Google on the Internet, even if not confidential (...) And never discuss the company with the press unless you have been explicitly authorised to do so by Corporate Communications*». In addition, Google unlawfully prohibits employees from disclosing potential violation of the law within Google itself, lawyers and governments, refraining at the same time Googlers from divulging information about their working conditions and wages. Employees are also subject to Google's Data Classification Guidelines which, despite it distinguish between "need-to-know", "confidential", and "public" information, considers as "confidential" even the last one, which includes Googlers' compensations and performances. In order to prevent both internal and external whistleblowing, Google engages in employee training programs - like the one entitled "You Said What?", stating that Googlers must «*avoid communications that conclude (...) that Google or Googlers are acting*

¹⁴⁶ *Doe vs. Google Inc. et al.*, Docket No. CGC16556034 (Cal. Super. Ct. Dec. 20, 2016). Available at: <http://tsi.brooklaw.edu/sites/tsi.brooklaw.edu/files/filings/doe-vs-google-inc-et-al/20161220employee-sues-google-overbroad-confidentiality-agreements.pdf> .

'illegally' or 'negligently', have 'violated the law', (...) or otherwise convey legal meaning» -, internal investigations - like the "Stopleaks" program, inclusive of interviews with the subjects of investigations, as well as the victims and witnesses, through which employees are required to promptly report suspicious activities within the workplace, thus pushing them to snitch on each other -, and threats of terminations and litigation - with Google's attorneys and executives advising Googlers by email and orally that they will be fired if they disclose "confidential information". If Google is found culpable, it could be fined up to \$ 3.8 billion, 75% of which would be collected by the state and the rest distributed among Google's employees. In a statement given to the Guardian (Hern, 2016), a Google's spokesperson, after describing the lawsuit as "baseless", added: «*Transparency is a huge part of our culture. Our employee confidentiality requirements are designed to protect proprietary business information, while not preventing employees from disclosing information about terms and conditions of employment, or workplace concerns*».

4.2.5 Alternative approaches

Author: Ricard Espelt and Enric Enabre Hidalgo

Google services provide a large and holistic number of options that drive to users' dependence. For that reason, when we look for Google alternatives, we must explore a different type of technological tools¹⁴⁷. Let's analyse below some of them.

The most powerful alternative to Google Search is DuckDuckGo. Privacy is the main characteristic that defines DuckDuckGo. This service, however, "does not collect or share personal information", as they clarify on its website¹⁴⁸. This means that anyone who conducts a search will get the same results. This is a double-edged sword, precisely because Google knows us so well is able to offer us the results that most interest us, whether advertising or not. But it can also cause that, by living in an affinity bubble, we lose interesting information as opposed to our tastes.

In addition, DuckDuckGo offers searches in encrypted version (https), it does not show promoted results and its advertising can be disabled easily. By not needing a user profile, searches cannot be as accurate as in the case of Google, but in most cases it is not necessary. The service is developed in open source, so from DuckHack users can improve the platform. DuckDuckGo business model relies on advertising (showing an ad based on the keyword typed into the search box) and by affiliate revenue through Amazon and eBay affiliate programs (DuckDuckGo gets a small commission when a user buys an item after getting there through its searcher)¹⁴⁹

In the same approach, Quant¹⁵⁰ search engine has some basic principles, such as not tracking its users, nor does it filter web content. It also uses a friendly design and an interface adapted to mobile devices.

¹⁴⁷Hartley, M. (2011) Open source alternatives to Google <https://www.datamation.com/osrc/article.php/3923746/Open-Source-Alternatives-to-Google.htm>

¹⁴⁸ <https://duckduckgo.com/privacy> .

¹⁴⁹ More info:

<https://fourweekmba.com/duckduckgo-vs-google/#Inside-DuckDuckGo-How-does-DuckDuckGo-make-money>

¹⁵⁰ More information: <https://www.qwant.com> .

At the same time, even though its global popularity, Google Search engine has not a dominant position in all countries. On the one hand, Yandex, which is one of the largest internet companies in Europe, it's the operating Russia's most popular search engine. Recently the company has designed a new application¹⁵¹ to monitor search traffic and browser usage, which show its popularity in Russia¹⁵². On the other hand, Baidu is leading Chinese language search engine, providing a "simple and reliable" search experience, strong in Chinese language and multi-media content (including MP3 music and movies, the first to offer WAP and PDA-based mobile search in China)¹⁵³.

Regarding the Google Mail service, Roundcube is a relevant alternative, a free and open source solution with a desktop-like user interface which is easy to install/configure and that runs on a standard LAMP server. The skin uses the latest web standards to render a functional and customizable UI. Roundcube includes other sophisticated open-source libraries such as PEAR, an IMAP library derived from IlohaMail the TinyMCE rich text editor, Googiespell library for spell checking or the WasHTML sanitizer. Roundcube Webmail is released under the GNU General Public License version 3 or any later version, with exceptions for skins and plugins. Everyone is welcomed to download and use it, deploy it and to re-distribute it. The code is provided «as-is» and in no event shall the copyright owner or contributors be liable for any direct, indirect, incidental, special, exemplary, or consequential damages¹⁵⁴.

As an alternative to Google Talk, Ekinga¹⁵⁵ (formerly known as GnomeMeeting) is an open source SoftPhone, Video Conferencing and Instant Messenger application. This tool offers a mix between a simple chat application and a professional IP Telephony tool for the GNU/Linux desktop. As a SIP softphone, it can completely replace hardware SIP IP phones and many people are using it as such.

With regard to collaborative documentation tools, TeamDrive Extension¹⁵⁶, which is supporting the open source office suite Open Office, works as alternative freeware to Google's Drive service. With this tool, only users decide who can access their data. This technology provides an unparalleled 256 bit end to end encryption.

As alternative to Google Photo and Picasa, digiKam¹⁵⁷ offers an advanced open-source digital photo management application that runs on Linux, Windows, and MacOS. The application provides a comprehensive set of tools for importing, managing, editing, and sharing photos and raw files.

In conclusion, nowadays, in spite of the existence of some open source alternatives, users need to explore different types of solutions so as to get the large integrated options that Google provides.

¹⁵¹ Yandex Radar: <https://radar.metrika.yandex>

¹⁵² More information on Phil Bradley's website review: <http://www.philb.com/yandexreview.html>

¹⁵³ More information: <http://ir.baidu.com/phoenix.zhtml?c=188488&p=irol-homeprofile>

¹⁵⁴ More information: <https://roundcube.net/about/>

¹⁵⁵ More information: <http://ekiga.org>

¹⁵⁶ More information: <https://www.teamdrive.com/en/>

¹⁵⁷ More information: <https://www.digikam.org/about/>

4.3 Social media: the case of Facebook

Author: Giulia Rocchi

As shown in the underlying image, Facebook is the undisputed global leader in the social network domain. As of the first quarter of 2017, the worldwide number of Facebook monthly active users¹⁵⁸ amounted to 1.94 billion, with an increase of 17% year-over-year¹⁵⁹. According to the Facebook Annual Report¹⁶⁰, revenue was \$27.64 billion in 2016, up 54% year-over-year, and advertising revenue, accounting for almost the just cited amount and increasingly originated more from mobile devices than through desktop computers¹⁶¹, was \$26.89 billion, with a growth rate even higher than the revenue one.

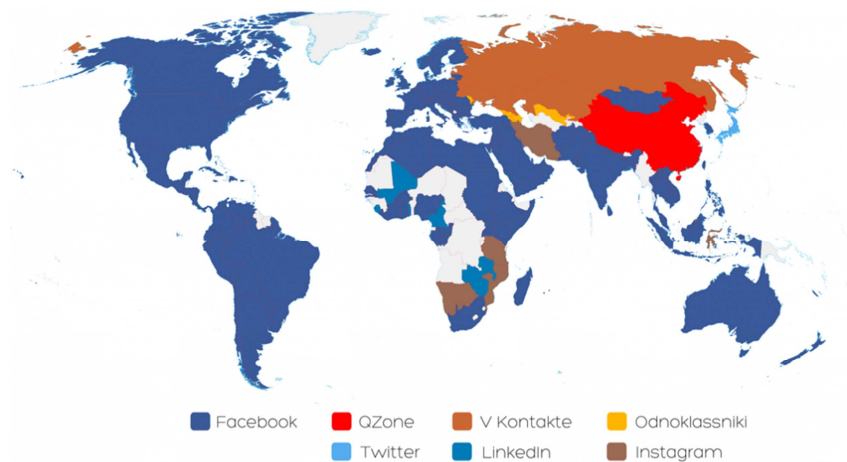


Fig. 4.8: World map of Social Networks

Source: <http://vincos.it/world-map-of-social-networks>

4.3.1 General description

Social media sites and services - assuming some undeniable differences with reference to their current levels of technical functionalities, dissemination and use - began forming long before many use to think. To some extent, it can be said that «*the Internet started out as nothing more than a giant Bulletin Board System (BBS) that allowed users to exchange software, data, messages, and news with each other*» (Kaplan & Haenlein, 2010, p. 60).

Social Media's ancestor can be detected in Usenet: created in 1979 by two American students, Usenet is a worldwide network consisting of thousands of interconnected servers each gathering articles, posts and files sent by users and thematically organized

¹⁵⁸ A Monthly Active User (MAU) is defined as a registered Facebook user who logged in and visited Facebook through the website or a mobile device, or used Messenger application at least one time in the last 30 days; this metric, as well as those about the Daily Active Users (DAU's) and the Average Revenue Per User (ARPU), do not include Instagram, WhatsApp, and Oculus users. See: Facebook Annual Report (2016).

¹⁵⁹ See: <https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/>

¹⁶⁰ Facebook Annual Report (2016).

¹⁶¹ According to the latest statistics from web analytics firm StatCounter, in October 2016 the desktop and the mobile's shares of Web browsing worldwide intersected, with global mobile traffic accounting for 53% versus the desktop's 42,21%. See: <http://gs.statcounter.com/platform-market-share/desktop-mobile-tablet/worldwide>. In the specific case of Facebook, Mobile advertising revenue represented roughly 83% of total advertising revenue in 2016 See Facebook Annual Report (2016).

in a public archive that can be consulted by all subscribers. We have to wait fifteen years before the genesis of the first personal blog (Rosen, 2004): in 1994 a nineteen years old Justin Hall, a Swarthmore College student, created Links.net¹⁶², becoming the first world's blogger. One year later the first Social Network Site on the Web was launched by the American engineer Randy Conrads: Classmates¹⁶³ allows its users to find, interact, and keep in touch with friends and acquaintances known during both the education path and at workplaces. Sixdegrees and Friendster - the former launched in 1997 to «*find the people you want to know through the people you already know*» and the latter opened in 2002 as a dating site to help friends-of-friends meet, complementing the business platform Ryze.com - held all the features that, as we will see, characterises modern Social Networks (Boyd & Ellison 2008).

Among the crowd of Social Media Sites that has pervaded the cyberspace since the year 2003 onwards, we can find familiar names like LinkedIn, Myspace, Second Life, Flickr, YouTube, Facebook and Twitter. As a consequence of massive smartphone diffusion¹⁶⁴, that has multiplied people's opportunities to "stay connected", these tools have become part of everyone's daily life, leading also to the birth of unprecedented diseases like online social network sites addition¹⁶⁵ and technostress¹⁶⁶. At time of writing, according to Alexa's web traffic data and analytics, five out of the ten most visited websites in the world are Social Network Sites¹⁶⁷.

With regard to what precisely is meant by Social Media - given the great variety in terms of features, scope and user base - several definitions can be found in the literature, most of which are as broad as the phenomenon they try to detail. Kietzmann, Hermkens, McCarthy & Silvestre (2011), with a view to explain the opportunities and threats for firms dealing with the "Social Media ecology", argue that these social software «*employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content*» (Kietzmann et al., 2011, p. 241). Other authors describe Social Media as «*a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content*» (Kaplan & Haenlein, 2010, p. 61), where Web 2.0¹⁶⁸ and User Generated Contents¹⁶⁹ are respectively the platform for the flowering of Social Media

¹⁶² Available at: <http://links.net/> .

¹⁶³ See: <http://www.classmates.com/> .

¹⁶⁴ The total number of smartphones sold to end users has been steadily increasing, passing from 122 million in 2007 to almost one and half billion devices in 2016. A third of the world's populations is expected to own a smartphone by 2018. See: <https://www.statista.com/topics/840/smartphones/> .

¹⁶⁵ See for instance: Andreassen (2015).

¹⁶⁶ See for instance: Yu, Kuo, Chen, Yang, Yang & Hu (2009).

¹⁶⁷ See: <https://www.alexa.com/topsites>

¹⁶⁸ Differently from Web 1.0, where users employed the Internet to merely enjoy content (by reading, watching or using it to buy services and product), Web 2.0 - along with the growing availability of broadband Internet access and advanced software tools - is marked by the transition from static webpages to dynamic platforms in which the participation of users in the production, modification, and distribution of digital content, both in a private and in a commercial perspective, profoundly and globally reshapes both the economic and the societal environment.

¹⁶⁹ As reported by the OECD, despite the absence of a general accepted definition of User Created Content, the latter should honour three main requirements in order to be deemed as such: i) it must be published on a public website or on a social networking site only accessible to a selected group of people; ii) it must show a certain amount of creative effort; iii) it must not fall into a commercial context. OECD (2007), *Participative Web: User-Created Content*. Available at: <https://www.oecd.org/sti/38393115.pdf> .

and the sum of all ways people make use of them. A classification scheme is then proposed relying on two fundamental elements of Social Media, in turn composed by two further components: the media related dimension, which includes social presence degree (i.e. the contact - be it interpersonal or mediated, asynchronous or synchronous - that can be attained between two or more communication partners), and media richness' degree (i.e. the volume and type of information they permit to be sent); the social dimension consists of self-presentation (linked to the care of how we are perceived by the people around us) and self-disclosure's degree (i.e. the extent to which we unveil personal information about ourselves). By combining these two dimensions and the correlated components, a categorization table is built, assigning scores from the lowest to the highest to the following Social Media types.

SOCIAL PRESENCE/MEDIA RICHNESS			
		Low	Medium
High			
SELF-PRESENTATION/ SELF-DISCLOSURE	Blogs	Social Networks (e.g., Facebook)	Virtual social worlds (e.g., Second Life)
	Collaborative projects (e.g., Wikipedia)	Content communities (e.g., YouTube)	Virtual game worlds (e.g., World of Warcraft)

Tab. 4.3: Social Media classification on the basis of their inherent levels of social presence, media richness, self-presentation, and self-disclosure
Source: Kaplan, & Haenlein (2010).

Indeed, the world of Social Media is probably much wider: Aichner & Jacob (2015), identified 13 types of Social Media, providing a description and some examples for each category. One of these categories is evidently that of Social Networks, namely this section's subject of study.

We rely on the definition provided by a recent paper, in turn derived from the already cited work done in 2008 by Boyd and Ellison, which lingers also on the difference between Social Network and Social Networking Sites: while the former allows users to preserve and deepen relationships with people who are already part of their physical world's network, the latter underline a relationship inception that occurs generally among strangers.

Social Networks are «*web-based services that allow individuals to construct a public or semi-public profile within a limited forum, to articulate a list of other users with whom they share a connection (...), and to view and traverse their list of connections and those made by others within the system*» (Gebika & Heinemann 2014, p. 152). Given the uncertainty of including or not Twitter (a micro-blogging service where anyone can "follow" you), YouTube (a platform focused on video-sharing), and LinkedIn (a "professional" network) within such a definition, in Facebook/WhatsApp merger decision the European Commission opted for an "open" solution, designating SNS's as

services that «enable users to connect, share, communicate and express themselves online or through a mobile app»¹⁷⁰. Facebook unquestionably meets both the wide and the narrow definition.

The story of the world's most popular Social Network is notorious. As in the case of Google, the company's roots have to be searched in the academic context. The early version of the site, called "Thefacebook" and founded in February 2004 by Mark Zuckerberg - student in psychology at Harvard University and passionate about software programming - could be joined only by users who owned a Harvard.edu email address (Boyd & Ellison 2008; Kietzmann et al. 2011; Gebika & Heinemann 2014). In view of the remarkable success achieved¹⁷¹, the network rapidly expanded to all American universities, became "Facebook" in August 2005 and broaden its horizon beyond educational institutions getting accessible to any e-mail address holder aged at least 13.

Over the course of little more than a decade, Facebook has acquired 65 companies (inclusive of assets and talents) for a total of more than \$ 23 billion expenditures, excluding undisclosed acquisitions' sums¹⁷². This big block of acquisitions can be broken up into four main segments, each of which follows a precise marketing strategy tied to the gradual evolution of the company.

The first one includes all those purchases aimed to improving Facebook website's features: among these we find FriendFeed (a real-time feed aggregator whose "Like" button and "News Feed" functions have become Facebook's hallmarks since 2009), Octazen Solutions (whose contact importer service was incorporated into "Facebook's Friend Finder" in 2010), and DivvyShot (whose photo-sharing technologies were integrated into "Facebook Photos" in the same year).

The second subset encompasses acquisitions needed to enter the smartphones' industry: SnapTu (a mobile application platform) and Beluga (an instant group messaging app and web service also) represent the foundations of Facebook Mobile and Facebook Messenger (a messaging app both for mobile and desktop computers, separated from Facebook's platform). In this field, we also find the most expensive company's investments: in 2012 Instagram (a photo-sharing social network still working under its own brand although some of its features have been integrated into Facebook) was bought for \$1 billion, while the acquisition of WhatsApp (a free mobile messaging app) was valued \$ 19 billion and has freshly been, as we will see later on, at the centre of an antitrust investigation and provision.

The third segment concerns the implementation of Facebook's advertising revenue model. In 2013 the company absorbed and re-designed the ad-serving and ad-campaigns' performance measurement platform Atlas Solutions, previously owned by Microsoft. By matching Atlas' own tracking techniques both with Facebook's huge

¹⁷⁰ European Commission (2014), "Facebook/WhatsApp", Case No COMP/M.7217, dated 03.10.2014, p. 8.

¹⁷¹ The site registered 1.200 subscriptions within 24 hours, covering over half of the undergraduate population one month later. See Phillips (2007).

¹⁷² For a list of Facebook's mergers and acquisitions, updated to 2017, see the infographic included in the following website: <https://www.techwyse.com/blog/infographics/65-facebook-acquisitions-the-complete-list-infographic/> .

repository of anonymized first-party data, insights from offline purchase data providers¹⁷³ and people-based advertising (instead of the outdated cookies-based one, which have become unreliable since mobile's advent and the consequent change in users' purchasing behaviour shifted to cross-device habits), this investment appeared to some observers¹⁷⁴ as an attempt to build an ad network outside of Facebook, challenging Google's domain in online display advertising.

The decision, announced in 2016, to move Atlas from Facebook's ad tech group to its measurement division due to bad quality and fraud issues¹⁷⁵, summed to the synchronous closure of both FBX¹⁷⁶ (a desktop ad-exchange service allowing third party companies to buy advertising spots on the social network) and LiveRail¹⁷⁷ (a video ad-exchange acquired in 2014 for half a billion dollars), mirrors Facebook's intentions to build a closed and centrally controlled "off Facebook" digital advertising ecosystem, a "walled garden" that keeps data sheltered from other parties' access and whose name is Facebook Audience Network (Peterson, 2016). This latter, working in synergy with Facebook Ads Manager, represents the company's essential revenue source. Its operating mode will be explained in the coming section.

The fourth and final segment concerns diversification, namely acquisitions in sectors other than social advertising. Nonetheless, these purchases can be considered still strongly related to its core business, when compared to Google's "moonshots". In 2014 Facebook acquired virtual reality tech company Oculus VR, fitness/health tracking app company ProtoGeo, and UK solar-powered drones' maker Ascenta. This latter talent acquisition – combined with a team composed by members of NASA's Jet Propulsion Laboratory, NASA's Ames Research Centre, and the National Optical Astronomy Observatory¹⁷⁸ - has been functional to the development of a larger project in the framework of a specifically created R&D group called Connectivity Lab¹⁷⁹: Internet.org¹⁸⁰, in partnership with some telecom industry giants, is a mobile application whose goal is that of bringing affordable internet access to that - still prevalent - portion of the world that has not experimented yet the 'benefits of connectivity', by using vehicles like, precisely, high altitude solar powered unmanned aircrafts (that is drones), lasers and satellites. The platform was rechristened with the less pretentious name of "Free Basics" in September 2015, after digital rights groups from 31 countries signed an open letter¹⁸¹ to Zuckerberg, saying that Internet.org, by providing access to a tiny and selected set of websites and services rather than to the full Internet, 'violates the principles of net neutrality, threatening freedom of expression, equality of opportunity, security, privacy and innovation'.

¹⁷³ Facebook has partnered with third party data vendors (that is data brokers) Axciom, Epilson, Experian, Datalogix, Oracle, and Quantum, to reach people on the basis of what they buy and do offline. For more information about Facebook Partner Categories see: <https://www.facebook.com/business/a/facebook-partner-categories>

¹⁷⁴ See for instance: Marshall J., Facebook Extends Reach With New Advertising Platform, The Wall Street Journal, 22/09/14. Available at: <https://www.wsj.com/articles/facebook-extends-reach-withad-platform-1411428726> .

¹⁷⁵ See: <https://atlassolutions.com/2016/03/07/value-with-atlas/> .

¹⁷⁶ See for instance Meola (2016).

¹⁷⁷ See for instance Shields (2016).

¹⁷⁸ See: <https://info.internet.org/en/blog/2014/03/27/announcing-the-connectivity-lab-at-facebook/> .

¹⁷⁹ See: <https://info.internet.org/en/story/connectivity-lab/> .

¹⁸⁰ See: <https://info.internet.org/en/> .

¹⁸¹ The entire text is available at: <https://www.facebook.com/notes/access-now/open-letter-to-mark-zuckerberg-regarding-internetorg-net-neutrality-privacy-and-935857379791271/> .

4.3.2 Facebook's business model

According to an e-Marketer survey¹⁸² addressed to 551 social media marketers around the world, Facebook would be the most effective social media advertising platform, producing the highest Return On Investment (ROI) for almost 96% of the sample. When we consider that social advertising spending worldwide is forecast to account for 20% of all internet advertising by 2019¹⁸³ and is predicted to overtake newspapers ad investments, we could reasonably think that most of this expenditure will end up in the hands of Menlo Park's company. What cannot be contested in any way is that Google and Facebook are not two "duopoly competitors", but rather two independent Internet advertising monopoly platforms that work complementary in two different fields, respectively search advertising and social media advertising, capturing together more than a half of all the growth in global ad spend¹⁸⁴.

Facebook's business model has become more alike Google's since the addition to its advertisement management tool Facebook Ads Manager¹⁸⁵ of Facebook Audience Network (FAN) in 2014, a mobile-focused network which provides advertisers new means to extend their campaigns outside of the boundaries of Facebook itself, leveraging Facebook's unrivalled trove of personal data¹⁸⁶, and using the same high personalized targeting and measurement tools available for regular Facebook ads. This change took place throughout subsequent steps. FAN was conceived at first as an in-app advertising network, which allowed any advertiser to buy ad spaces from any third-party app developer (namely not only apps created by using "Facebook for Developers"¹⁸⁷). It expanded in 2016 to include, in addition to apps, third-party mobile websites that have opted into the network, further enlarging the likelihood of reaching right audiences off-Facebook but still restricting it to signed-in Facebook users (Chaykowski, 2016). In this same year the company announced that also people without a Facebook account would have become targets for Facebook-powered very informed ads (Slefo, 2016). It is then clear that Facebook's FAN operates in the same way as Google's AdSense.

We will now take a quick look at Facebook's complex demand-side marketing environment, leaning on the dedicated website¹⁸⁸.

By creating a Business Manager account, an advertiser will be able both to self-administer his Facebook Pages and ad accounts, and to count on *ad hoc* broker marketing agencies. After setting up account information (such as business name and address, currency, time zone etc.), billing and payment information, and the monthly advertising budget, he will be ready to self-arrange his advertising campaign by using the just created Facebook Ads Manager account.

¹⁸² See: <https://www.emarketer.com/Article/Social-Media-Marketers-Facebook-Produces-Best-ROI/1013918> .

¹⁸³ See: <http://fortune.com/company/pgpef/> .

¹⁸⁴ See: <https://www.zenithmedia.com/google-facebook-now-control-20-global-adspend/> .

¹⁸⁵ See: <https://business.facebook.com/> .

¹⁸⁶ Other valuable sources of information are the "Like" and "Sign in with Facebook" buttons scattered around the Web.

¹⁸⁷ See: https://developers.facebook.com/?locale=en_UK .

¹⁸⁸ See: <https://en-gb.facebook.com/business> .

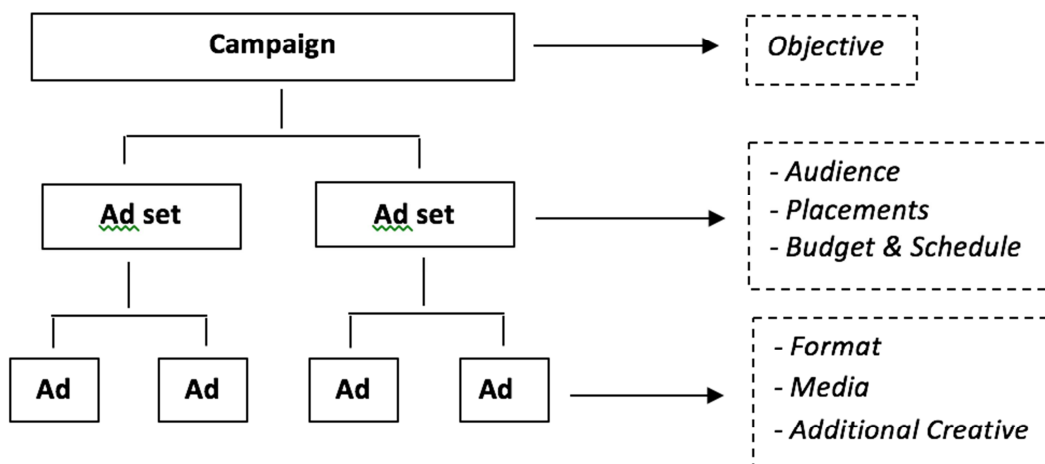


Fig. 4.9: Facebook's ad campaign structure

The **campaign's** ultimate objective will determine ad formats and bidding options. Facebook offers a wide set of goals grouped into three main categories: awareness, consideration and conversion. One campaign can have multiple **ad sets**. In this phase a target audience can be defined, on the basis of three primary audience types (saved, custom and lookalike audiences) and taking advantage of location, demographics, interest, behaviour, website traffic, app activity, and engagement-based targeting. Ads' placements can either be left to Facebook's automatic choice or manually configured: they will appear on desktop or mobile devices (or on both) and on multiple places, including: Facebook News Feed, Facebook right-hand column, Instagram, Messenger, and Facebook's external net, namely FAN. Assigning a budget (be it daily or lifetime, and based on a CPC, CPM, or CPA bidding strategies) and a schedule (by choosing which weekdays and time slots ads will be displayed) is the third step. The ad delivery takes place in the frame of a worldwide auction that is joined by hundreds of thousands of advertisers.

Each time an auction occurs, Facebook will combine three factors (bid amount, relevance score, and estimated action rate) into a total value. The ad with the highest total value will be eligible to appear in the most suitable corners of Facebook's ecosystem. The first factor is the maximum sum the advertiser is willing to pay to win the ad space and it is likely to be always lower than the effectively charged amount. The second one is Google Quality Score's twin, a score on a scale of 1 to 10 that rates an ad based on how relevant (that is, the level of "attention" the ad receives in terms of likes, shares, comments, clicks, conversions etc.) it proves to be to the targeted audience. This means that targeting the right audience will lead to a good CTR which in turn will low down the CPC/CPM/CPA, and will increase the Relevance Score. Finally, the estimated action rate is an appraisal of the likelihood a user performs the actions required to achieve the results the advertiser has bet on.

PLACEMENTS →					
ADS FORMATS ↓	Facebook News Feed (desktop)	Facebook News Feed (mobile)	Facebook right-hand column	FAN	Instagram
Link click Ads		✓	✓	✓	✓
Dynamic Products Ads	✓	✓	✓	✓	✓
Video Ads	✓	✓		✓	✓
Boosted Page Posts Ads	✓	✓		✓	✓
Carousel Ads	✓	✓		✓	✓
Facebook Lead Ads	✓	✓		✓	✓
Page Likes Ads	✓	✓	✓		
Event Ads	✓	✓	✓		
Page Post Photo/Video/Text Ads	✓	✓	✓		
Offer Claims Ads	✓	✓	✓		
Desktop App Ads	✓		✓		
Local Awareness Ads	✓	✓			
Canvas and Collection Ads		✓			
Mobile App Ads		✓			
Instagram Mobile App Ads					✓

Tab. 4.4: Overview of Facebook's ads designs on the basis of supported placements¹⁸⁹

As shown by the Figure 4.9 and the Table 4.4, each ad set can be composed of a bundle of **ads**, whose format (which can vary greatly), media channel and additional creatives (to further tailor the ad) should be carefully chosen according to the campaign's objective.

On the supply side we find the above mentioned Facebook Audience Network (tool)¹⁹⁰, which helps publishers and developers monetize their mobile websites and applications' inventories by hosting Facebook-powered ads that matches the interests of their audience, creating that sort of "virtuous circle" that we have seen arising in the case of Google: ads that match users' predilections drive better results for advertisers, which means more ad revenue for publishers and developers. The difference lays in a mobile-exclusive approach and tremendously compelling ads¹⁹¹, due to Facebook's unequalled in-depth knowledge of its clientele's habits, inclinations, tastes, fears, and so on.

We can therefore observe that Facebook Ads Manager works substantially as Google AdWords: ads' placements in Facebook News Feed, right column, Instagram and

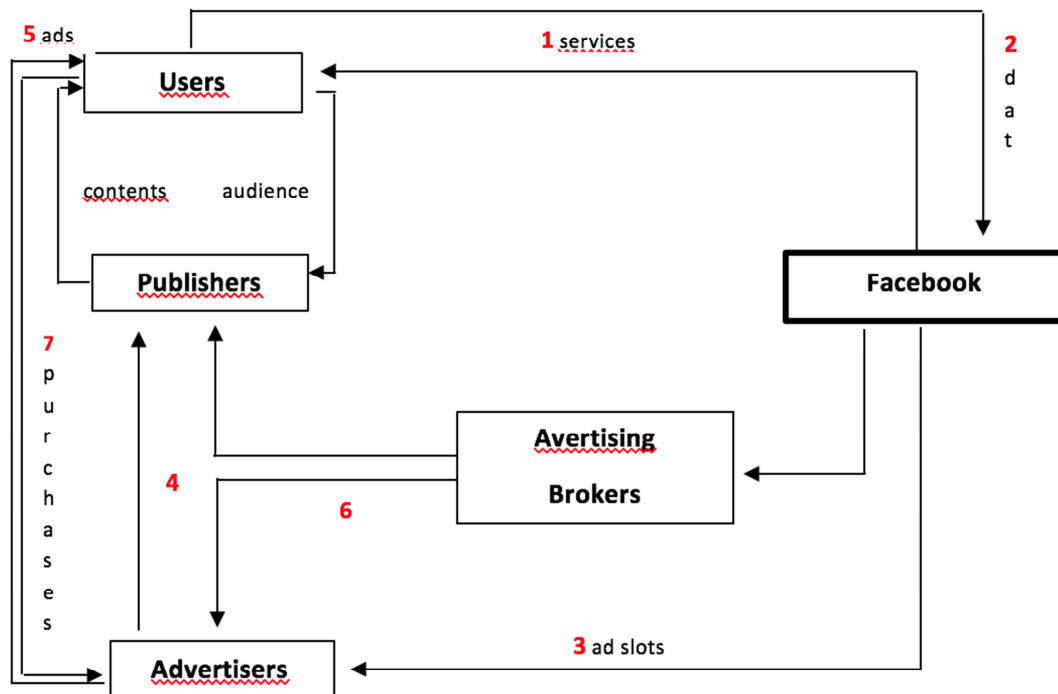
¹⁸⁹ The exclusion of Messenger from this classification is due to the fact that, if activated, Messenger's placement excludes all others possible placements. For a breakdown (advertising goal, recommended image size, headline, copy text, link description etc.) of each advertising type (which falls out of our purposes) see: <https://adespresso.com/guides/facebook-ads-beginner/facebook-manager-campaign-setup/>.

¹⁹⁰ See: <https://www.facebook.com/audiencenetwork>.

¹⁹¹ Native ads (which adapt their appearance to websites and applications' contents, in order to be perceived as non-intrusive purchasing advice), interstitial ads (full screen ads that pop up all of a sudden), and in-stream video ads (15/20 seconds mid-roll videos shown to users while they are watching a video) are among the most profitable FANS' ads formats.

Messenger can be equalized to Google SERP's sponsored results, where revenue streams arising from clicks (or conversion actions) on ads belong to Google and Google alone. Likewise, Facebook Audience Network (net) corresponds to Google AdSense supply-side platform: Facebook shares a percentage of its advertising profit with those publishers and developers which, by adhering to FAN, house ads within their mobile websites and applications (these latter conceived both through "Facebook for Developers" or by adopting any other app-building platforms).

4.3.3 Value creation model: a simplified framework



1 Facebook’s platform offers a costless vast array of technology features to its subscribed users.

2 Users provide Facebook (who takes note of every single bit) with information of all kinds, from more standard to less intuitive types of data (Dewey, 2016).

3 Through Facebook Ads Manager, advertisers purchase advertising slots from Facebook, on the basis of a real-time auction mechanism. Ads will be displayed either on Facebook’s platform itself (Facebook News Feed for desktop and/or mobile, Facebook right-hand column, Instagram, and Messenger) (**5**) or on publishers’/developers’ websites/apps (**4**) who, being registered to FAN (net) through FAN (tool), are paid for hosting Facebook-powered ads.

6 Advertising spaces can be purchased/offered either directly through Facebook Ads Manager/FAN (tool) or indirectly through an advertising agency.

7 Advertisers’/publishers’/developers’ expenses/revenues do not depend on the actual purchase of the advertised product or service, but on the clicks done on the ads by users, namely on the mere “attention” that they grant (by chance, mistake or real interest) to ads.

4.3.4 Risks connected to the current value creation model

Competition

Contrary to several IT's industry sectors which have been under scrutiny from the antitrust authorities and have produced important competition law cases worldwide since the 80's¹⁹², social media platforms, with Facebook in pole position, have begun to attract regulators' attention only in recent times. The following sections will recapitulate both the anti competitive practices that the Menlo Park company has carried out, and those which may potentially and plausibly occur in the near future.

The Facebook/WhatsApp merger assessment

In this 2014 decision¹⁹³, the relevant markets individuated by the EC were those related to (i) consumer communications services, (ii) social networking services, and (iii) online advertising services; the two companies competed in one domain, as Facebook Inc. owns also a communications app, named Facebook Messenger. The significant differences relating to the two entities' privacy policies¹⁹⁴ have been used by the Commission as a factor (among others as the identifiers used to access the services and the sources of the contacts) that makes the parties' offerings in consumer communication apps complementary, rather than competitor services¹⁹⁵. The respective communications functionalities and networks' sizes are the only aspects on the basis of which WhatsApp and Facebook Messenger have been considered close competitors, aspects mitigated by the high overlapping degree between the two networks (with WhatsApp users already using Facebook Messenger or subscribed to Facebook), and by their offering's characteristics (with WhatsApp not requiring the 'affiliation' to a social network and therefore in closer competition with an app like Viber).

In paragraph 72, the Commission specified that no possible market definition with respect to the provision of data or data analytics services had been investigated, as none of the parties is active in such markets: indeed, in the previous paragraphs, it explained that « *Facebook does neither sell any of the user data it collects nor provides data analytics services to advertisers or other third parties as a stand-alone product separate from the advertising space itself* » (p. 11, §70), and that WhatsApp « *does not store or collect data about its users that would be valuable for advertising purposes* » (p. 12, §71). For such reasons, the Commission « *has analysed potential data concentration*

¹⁹² Besides the Google cases, see: the 1981 and 2011 IBM cases (Case 60-81 - *International Business Machines Corporation v Commission of the European Communities*, 11/11/81, available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A61981CJ0060> ; Case COMP/39.692 - *IBM Maintenance Services*, 13/12/11, available at: [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012XC0121\(01\)&from=IT](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012XC0121(01)&from=IT)) ; the 2007 Microsoft case (Case T-201/04 - *Microsoft Corp. v Commission of the European Communities*, 17/09/07, available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62004TJ0201>) , and the 2009 Intel case (Case COMP/C-3/37.990 - *Intel*, 13/05/09, available at: [http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52009XC0922\(02\)](http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52009XC0922(02))).

¹⁹³ European Commission (2014), Case No. COMP/M.7217 - Facebook/WhatsApp, 03/10/14, § 185-187.

¹⁹⁴ « *Contrary to WhatsApp, Facebook Messenger enables Facebook to collect data regarding its users that it uses for the purposes of its advertising activities*» (*Ibidem*, p. 18, §102).

¹⁹⁵ A dissenting stance with regard to this point was articulated by a Norwegian competition law scholar in an article arguing that the Commission failed to assess the incentives of the parties to compete, despite their divergent ways in valuing privacy issues, on privacy policies once the merge would have been approved. For more information, see: Esayas (2017).

only to the extent that it is likely to strengthen Facebook's position in the online advertising market » (p. 29, §164). It then added that any privacy-related concern which might arise from such concentration of data did not fall within the scope of the EU competition law rules.

In the EC's view, the data collected by WhatsApp about its users would not have been of great use for Facebook's advertising-related activities, as the application does not store messages once they are delivered, and thus the only information it owns about its users include their name and their phone numbers; in many cases, the same content is already known by Facebook regarding its own users. WhatsApp, launched in 2009 by two former employees of Yahoo!, have always openly had a healthy aversion to advertising, described as *«the disruption of aesthetics, the insults to your intelligence and the interruption of your train of thought»*¹⁹⁶. Moreover, before the assessment, WhatsApp had publicly stated¹⁹⁷ that its partnership with Facebook would not have changed WhatsApp's privacy policies – *«Respect for your privacy is coded into our DNA and we built WhatsApp around the goal of knowing as little about you as possible (...) None of that data has ever been collected and stored by WhatsApp, and we really have no plans to change that »* –, allowing it *« to continue operating independently and autonomously»*.

The Commission concluded that there were no high incentives for the merged entity to start collecting data from WhatsApp users, and even if it did, this would not have raised any competition concern related to the advertising market. The \$ 19 billion merger was then approved. Two years later, on 25th August 2016, WhatsApp announced a change to its terms and conditions and privacy policy¹⁹⁸. If accepted, the new setting allowed the app to share some of users' account information (like phone numbers and details about last access' details) with Facebook and the Facebook family of companies. Messages are still end-to-end encrypted by default, but the updating allows the app to more accurately count unique users using track basic metrics' tools, better fight abuse and spam, and receive more relevant ads on Facebook. Furthermore, the company disclosed its intention to explore ways to let users, using WhatsApp, communicate (by obtaining order, transaction, shipping and appointment notifications amongst other) with businesses: *«For example, you may receive flight status information for upcoming travel, a receipt for something you purchased, or a notification when a delivery will be made. Messages you may receive containing marketing could include an offer for something that might interest you»*¹⁹⁹. These plans are close to be realized, since the Facebook-owned chat platform announced on 5th September 2017²⁰⁰ that he is testing new features designed for specifically business-to-customer service communications: a free WhatsApp Business standalone app for small and mid-size enterprises, which has recently reached the testing stage, and an "Enterprise Solution" *«for bigger companies operating at a large scale with a global base of customers, like airlines, e-commerce sites, and banks»*.

¹⁹⁶ See: <https://blog.whatsapp.com/245/Why-we-dont-sell-ads?> .

¹⁹⁷ See: <https://blog.whatsapp.com/529/Setting-the-record-straight?l=en> .

¹⁹⁸ See: <https://blog.whatsapp.com/10000627/Looking-ahead-for-WhatsApp> .

¹⁹⁹ See: <https://faq.whatsapp.com/general/28030012> .

²⁰⁰ See: <https://blog.whatsapp.com/10000633/Building-for-People-and-Now-Businesses> .

In October 2016 the EU data protection authorities, gathered under the Article 29 Working Party, addressed a letter²⁰¹ to Jan Koum, CEO and co-founder of WhatsApp, soliciting (and obtaining) the suspension across Europe of the sharing of users' data with the parent company. Some months later, the European Commission sent a Statement of Objections²⁰² to Facebook, taking the preliminary view that, in contrast to Facebook's statements during the merger's review, the technical possibility to automatically link the two companies' users accounts was already existing and well known by Facebook staff at the time of merger investigations.

On 18th May 2017²⁰³, the Commission imposed to Facebook a € 110 million fine (mitigated by Facebook's cooperation during the procedural infringements proceedings) for breaching the EU Merger Regulation by providing misleading information. That very same day, a Facebook spokesperson declared: « *We've acted in good faith since our very first interactions with the Commission and we've sought to provide accurate information at every turn. The errors we made in our 2014 filings were not intentional and the Commission has confirmed that they did not impact the outcome of the merger review* »²⁰⁴.

This case has highlighted that, even though data protection and competition represent separate legal areas, each one focusing on its own competences, and despite authorities in each field have limited tools at their disposal, the confines among these different regulatory jurisdictions are anything but fixed. « *It is not a question of 'instrumentalizing' another area of law* », the European Data Protection Supervisor²⁰⁵ wrote in an opinion²⁰⁶ published in 2016 « *but rather of synchronising EU policies and enforcement activities, adding value where a supervisory authority lacks expertise or legal competence in analysing* » (p. 10).

Alleged abuse of dominant market position

The concept of fairness is a fundamental benchmark in personal data processing²⁰⁷, and 'imposing unfair purchase or selling prices or other unfair trading conditions' is included in the definition of abuse of dominance within Article 102 of the TFEU (former Art. 81 TEC). The proceedings opened²⁰⁸ in March 2016 by the German Federal Cartel Office against Facebook for suspected abuse of dominant position in the market of social networks through the imposition of unfair terms of service on its users with regard

²⁰¹ ARTICLE 29 Data Protection Working Party, Brussels, 27/10/16. Available at: https://www.cnil.fr/sites/default/files/atoms/files/20161027_letter_of_the_chair_of_the_art_29_wp_whatsapp.pdf .

²⁰² See: http://europa.eu/rapid/press-release_IP-16-4473_en.htm .

²⁰³ See: http://europa.eu/rapid/press-release_IP-17-1369_en.htm .

²⁰⁴ See: <https://newsroom.fb.com/news/h/facebook-comments-on-resolution-of-european-commission-inquiry/> .

²⁰⁵ The European Data Protection Supervisor is the European Union's independent supervisory authority established by the 2001 Regulation on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data. It is in charge for advising EU institutions on all matters relating to the processing of personal information, ensuring its protection and monitoring the development of new technologies that may influence such guarantee, and cooperating with national data protection authorities to promote implementation measures' uniformity.

²⁰⁶ European Data Protection Supervisor (EDPS), Opinion 8/16, 23/09/16. Available at: https://edps.europa.eu/sites/edp/files/publication/16-09-23_bigdata_opinion_en.pdf .

²⁰⁷ EU Charter of Fundamental Right of the European Union, Article 8 (2).

²⁰⁸ See: http://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2016/02_03_2016_Facebook.html?nn=3591286 .

to the use of their personal data²⁰⁹, suggest that data privacy rules are beginning to be not only theoretically considered as market conditions that should be taken into account for consumer welfare analysis.

Besides German Bundeskartellamt, no other national competition regulator is publicly investigating Facebook's business strategies at the present time. Nonetheless, Swiss scholars Gebika & Heinemann (2014) has outlined the most relevant and probable misconducts that the company is likely to realize on the grounds of its so far unreachable position in the social network domain. It is thus worth firstly recalling the text of Article 102 of the Treaty on the Functioning of the European Union, which (let us not forget) does not forbid the holding of a dominant position *per se* but only an abuse of it.

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

Such abuse may, in particular, consist in:

- (a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;*
- (b) limiting production, markets or technical development to the prejudice of consumers;*
- (c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;*
- (d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts²¹⁰.*

Abuses may therefore be divided into two main categories, namely exploitative abuses (lit. (a) and (b)), involving consumers or suppliers, and exclusionary abuses (lit. (c) and (d)), directed instead at competitors.

With regard to exploitative abuses, and in strong opposition to US antitrust law - which considers monopoly (namely, high) prices as able to spur competition -, European antitrust law not only oversees the field of price-related dominant undertakings' behaviour but encompasses any other exploitation practice that can possibly derive from their greater economic power. Signing up to Facebook, average users have to accept that the firm has privileged jurisdiction in relation to the physical layout that, shaped upon the information they transfer to the platform, their personal pages and related ads will have. In the occurrence of far-reaching, unilateral modifications of the product, and in order to enable users to pull out personal information they would prefer not to be shown in the new environment, the change should be timely announced and clearly explained, notably when it comes to dominant firms' "special responsibility"²¹¹.

²⁰⁹ The difficulties that users meet in understanding and assessing the scope (i.e. the extent to which they agree to surrender their personal information) of the agreement they have to accept in order to access the social network is likely to be inadmissible under data protection law. If a connection between this unlawful practice and market dominance will be found, this could also constitute an abusive practice under competition law.

²¹⁰ Consolidated Version of the Treaty on the Functioning of the European Union (TFEU), Art. 102.

²¹¹ «According to the case-law, holding a dominant position confers a special responsibility on the undertaking concerned, the scope of which must be considered in the light of the specific circumstances of each case» (III, A, 9).

In the case of Facebook, this peculiar responsibility is upheld by two major arguments. Primarily - and in line with Bundeskartellamt's approach in glimpsing a common ground between data protection and competition law -, if it is true that Facebook's Data Policy²¹² provides the scope underlying the transfer of rights from the user to the platform, it is also true that what the latter is really empowered to do with the information it collects - and that is stored in its servers regardless of the selection of the highest layers of security in Facebook's settings - and that users is forced to disclose in exchange for the participation to the service, is a question which is left open. Hence, *«if we begin with the idea that the remuneration for social media services paid by the user is not monetary in character, but instead consists of his attention (...) and his personal data (...), an undue increase in the use of personal data may very well be compared to excessive prices»* (*ibidem*, p 163).

Secondly, Facebook's account deletion is an onerous procedure. During the two-weeks waiting period after confirming the intention to unsubscribe, users cannot neither log back in the platform nor in other Facebook-powered applications, and not even accidentally click any "like" button that is present in an uncountable number of websites, because that would abolish the cancellation order. Furthermore, even after the two weeks expire and the account is permanently deleted, any type of information that users have shared with other people during their permanence on Facebook is not part of their account and is thus not removed²¹³.

From a technical viewpoint, efforts that users are required to undertake in order to delete their profile appear to be more than "reasonable", overstepping the limits an appropriate contractual relationship should consist of. At the same time Facebook, by stressing the procedure that users can follow in order *«not to delete, but to temporarily deactivate their profile while their data is kept warm for when they come back»* (*ibidem*, p. 166), seems to suggest them that they eventually will want to come back, putting a certain degree of psychological pressure. From a competitive perspective, all these factors - added to the fact that users, though completely free to do so, are disinclined to leave a social network which is likely joined by much of their friends and acquaintances, and upon which they have built job's and leisure's connections - may prevent users from shifting to a competing platform. The logic conclusion of this reasoning is that exploitative and exclusionary conduct in the context of dominant online undertakings tend to overlap.

Exclusionary abuses cover a wide set of practices, such as single-product rebates, predation, discounts bundled, and margin squeezes²¹⁴. Tying and bundling are among the most expected anti-competitive practices from a company with Facebook's reaching. 'Tying' refers to *«situations where customers that purchase one product (the tying product) are required also to purchase another product from the dominant*

2009/C 45/02, Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings.

²¹² See: <https://www.facebook.com/policy.php> .

²¹³ See: <https://en-gb.facebook.com/help/359046244166395/> .

²¹⁴ For a complete and critical description of each form of abuse see: Temple Lang & Renda (2009). For exclusionary conduct specifically related to data see paragraph 3.4 of this work.

undertaking (the tied product) »²¹⁵, and can take place on a technical (when the tying product's fashion is setup to properly work only with the tied product) or contractual (when the customer undertakes to buy the tied product in addition the tying one) basis. 'Bundling' refers instead to the offering of several products in the shape of a "package deal": «*In the case of pure bundling the products are only sold jointly in fixed proportions. In the case of mixed bundling (...) the products are also made available separately, but the sum of the prices when sold separately is higher than the bundled price*»²¹⁶.

Through a sole Facebook account, users can benefit of an abundance of features wrapped together into one single platform, but each one with a separate competitor: Twitter for status updates, Flickr for photo sharing, Skype for calls and chat, as a way of example. Moreover, YouTube's videos can be uploaded and played on the platform, and Instant Articles²¹⁷, launched in May 2015, allows publishers to show their editorial content²¹⁸ faster and directly in the Facebook mobile News Feed so that users don't have to wait some seconds for mobile web articles to load. Consequently, even though users are not prevented from migrating to the platforms from which videos and news originate from, it seems that *de jure* independent sources of information are *de facto* being subsumed from the platform, whose winning seems to be twofold: Facebook 'incentivizes' more publishers to adopt the new hosting format, appropriating the percentage of revenue when publishers insert FAN-mediated ads within the article; but, even though publishers opt for direct-sell, this tool keeps people logged and increase both the chances they interact with Facebook-promoted ads and the amount of their valuable digital footprints.

Privacy

As in the case of Google, concerns about privacy and data protection of Facebook's users have emerged constantly year after year. They began to appear shortly after the launch of the platform - when, in September 2006, the introduction of News Feed and Mini Feed provoked an immediate public backlash that culminated in a largely supported online petition calling on Facebook to remove the products (Leyden, 2006) - and have continued to rise through time, until the most recent fines imposed in succession by French CNIL²¹⁹ and Spanish AEDP²²⁰ for several data protection infringements, measures that inscribe themselves in a broader examination of Facebook's privacy policy at European level, which is being carried out from a Contact

²¹⁵ European Commission (2009), *Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings* (2009/C 45/02), Official Journal C 45/7, (III, B, 48).

²¹⁶ *Ivi.*

²¹⁷ See: <https://instantarticles.fb.com/> .

²¹⁸ Ads can appear inside the articles, with publishers retaining 100% of revenue if they sell them without FAN's intermediation; in this latter case Facebook will keep the 30%. According to the dedicated website, the reduce the likelihood that users abandon the page is more than halved, being Instant Articles' loading ten times faster than standard web articles'.

²¹⁹ CNIL (2017), *Facebook sanctionné pour de nombreux manquements à la loi Informatique et Libertés*, Commission Nationale de l'Informatique et des Libertés, 16/05/17, <https://www.cnil.fr/en/facebook-sanctioned-several-breaches-french-data-protection-act> .

²²⁰ AEDP (2017), *La AEPD sanciona a Facebook por vulnerar la normativa de protección de datos*, Agencia Española de Protección de Datos, 11/09/17, http://www.agpd.es/portalwebAGPD/revista_prensa/revista_prensa/2017/notas_prensa/news/2017_09_11-ides- .

Group²²¹ composed of (in addition to the just mentioned ones) the DPAs of the Netherlands, Hamburg and Belgium. In this section we will report the main findings of a recent research that sought to estimate whether the transformations that Facebook's privacy policy has undergone in the course of time have been beneficial for users with respect to accountability and data accessibility. We will then address the issue of Facebook's recurring psychological experiments on its users, whose overall data "constitutes the largest field study in the history of the world"²²².

Shore & Steinman (2015) found that, over the years, Facebook's privacy policy "has become less transparent, is harder for users to understand, and contains fewer options for user control over personal data in connection with third party access". In order to assess this descending evolution, the authors first harvested the 17 privacy policy's versions that Facebook progressively published between June 28, 2005 and May 8, 2015. The work relies on the Patient Privacy Rights' Trust Framework (PPR)²²³ which, developed in 2008 by Patient Privacy Rights and bipartisan Coalition for Privacy Rights, in concert with Microsoft and PwC, introduced a set of 15 gold standard privacy principles operationalized in 73 auditable criteria/measurements that should be embodied into all digital systems that handle individuals' personal health data in order to demonstrate that they are worthy of trust on the part of patients. It is worth reporting the list of principles in full:

1. Patients can easily find, review, and understand the privacy policy.
2. Privacy policy fully discloses how personal information will and will not be used by the organization. Patients' information is never shared or sold without users' explicit permission.
3. Patients decide if they want to participate.
4. Patients are clearly warned before any outside organization(s) that does not fully comply with the organization's privacy policy can access their information.
5. Patients can easily find, review, and understand the privacy policy.
6. Patients decide how and if their sensitive information is shared.
7. Patients are able to change any information that they input themselves.
8. Patients decide who can access their information.
9. Patients with disabilities are able to manage their information while maintaining privacy.
10. Patients can easily find out who has accessed or used their information.
11. Patients are notified promptly if their information is lost, stolen, or improperly accessed.
12. Patients can easily report concerns and get answers.
13. Patients can expect the organization to punish any employee or contractor that misuses patient information.
14. Patients can expect their data to be secure.
15. Patients can expect to receive a copy of all disclosures of their information.

²²¹ DPAs of The Netherlands, France, Spain, Hamburg and Belgium (2017), *Common Statement by the Contact Group of the Data Protection Authorities of The Netherlands, France, Spain, Hamburg and Belgium*, 16/05/17, https://autoriteitpersoonsgegevens.nl/sites/default/files/atoms/files/common_statement_16_may_2017.pdf.

²²² Statement by former Facebook's Data Scientist Adam Kramer, 29/03/12. Available at: <https://www.facebook.com/notes/facebook-data-science/meet-a-facebook-data-scientist-qa-with-adam-kramer/10150660264128859>.

²²³ PPR Trust Framework is downloadable at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2231667.

The PPR was then adapted to be applicable generally to social media platforms' privacy policies by substituting the word "patient" with "user", and excluding 40 criteria and 5 principles²²⁴ which were specifically health-related. A ranking of each Facebook privacy policy built on the compliance with each of the selected 33 criteria were made, on a scale from 0 (i.e. criterion not met at all) to 4 (i.e. criterion fully met). Whilst some criteria required the presence of a specific characteristic that could be easily verified (e.g. "Privacy policy must have topic headings that link to plain language explanations of the type of data accessed and how the data are handled", Principle 1 Criterion 4), most of them needed an extensive inspection of the concerned privacy policy (e.g. "System allows users to selectively release each element of their personal information", Principle 6 Criterion 1).

As regards to Principles 1 and 2, the examination of the respective measurements from the oldest to the latest policy statement highlighted that, in both cases, most of measurements worsened (5 out of 8 for Principle 1 and 7 out of 10 for Principle 2), while overall slight improvements concerned the non-use of passive structures (like "the sharing" instead of "we share"), the availability of the privacy policy in the native language of users, and mechanisms for Third Party resolution of complaints.

A deterioration from the best to the worst possible value (characterized by oscillations within the decade examined) was found both in the 4 measurements of Principle 5 and in the only one of Principle 6. Warranties concerning profiling options, as well as those related to users' entitlements to selectively release each element of their personal information and clearly identify data used for profiling and targeting, steadily scored zero over the whole period considered.

Principles 11, 12, and 15, constituted of one sole measurement each, constantly showed the lowest possible rating throughout the study period, with the exception of the criteria of Principle 12 (concerning the mandatory presence of a process that "enables users, advocates, employees, and government regulators to report potential or actual privacy violations"), which temporarily jumped to the best possible grade during a given time interval. Therefore, no advancement has been made neither in the duty to notify individuals whose information has been accessed as a consequence of a potential breach of personal data, nor in the expectation to receive a copy of all disclosures of their information.

The two measurements for Principle 3, covering opt-out processes and permanent deletion of users' data, fluctuated between the highest and the lowest level, and eventually found lower in 2015 compared to the first version of Facebook's privacy policy.

Finally, in relation to Principles 7 and 8, all measurements ended at the worst possible rating, with two out of five (concerning respectively the editing and the control over personal information by users) starting in 2005 at the highest possible score, and one (pertaining to how long access to data is available) reaching the best possible rating during a specific timeframe.

²²⁴ Principles 4, 10, 13, and 14 have been excluded because all criteria included in each of them were specific to health data, while Principle 9 has been excluded because measuring disability access was beyond the scope of the study.

Assuming that a comprehensive capture of all aspects of data management and data sharing is hardly feasible even for such an accurately devised framework, the fact that a decline in Facebook’s privacy policy has been ascertained in 22 of the 33 criteria the study has considered should be taken seriously into account from regulators, given the coverage of Facebook’s network, which at present is extended to more than a quarter of the global population.

The information that springs from this enormous amount of individuals is also analysed to «conduct surveys and research, test features in development» in order to «evaluate and improve products and services, develop new products or features, and conduct audits and troubleshooting activities», as Facebook’s privacy policy warns²²⁵. The word “research” is hyperlinked to the web page of Facebook Research²²⁶, where - among a rich bunch of research areas comprising Machine Learning, Virtual Reality, and Human-Computer Interactions – the Data Science branch consists of a team that, in the company’s own words, «conducts large-scale, global, quantitative research to gain deeper insights into how people interact with each other and the world around them» and shares its scientific findings with the academic research community.

Using computational methods, researchers can tap into a wealth of extraordinary high quality social and behavioural information with the more (Bakshy, Eckles, Yan & Rosenn, 2012) or less (Chang, Rosenn, Backstrom & Marlow, 2010) openly proclaimed purpose of improving Facebook’s business, as confirmed by founder and former chief of Data Science team Cameron Marlow: «Our goal is not to change the pattern of communication in society. Our goal is to understand it so we can adapt our platform to give people the experience that they want» (Simonite, 2012). Nevertheless, experiments that Facebook has been conducting since 2009 are diverse in size and scope²²⁷ and many of them aim at discovering to what extent Facebook can affect people’s actions not only within the platform itself but also in the off-line world. One notorious example is a massive-scale social experiment (Bond, Fariss, Jones, Kramer, Marlow, Settle & Fowler, 2012) that involved all registered Facebook users aged over 18 who logged into their account the day of 2010 U.S. midterm elections. On November 2, more than 61 million persons received a “social message” from Facebook in the form of a box placed at the top of their News Feed containing an “I Voted” button, along with a link to information about how to find their polling station, and six profile pictures of users’ Facebook friends who had already reported voting, and a counter displaying the total number of Facebook’s users who had already clicked on the voting button. A 10% of the sample was randomly assigned to view an “informational message” (identical to the social message except for pictures of friends) and another 10%, that served as the control group, did not receive any Election Day message. Researchers then compared the subsequent online behaviour of the three kinds of recipients and found that persons who had received the social message were more likely to seek for poll-related information and to click on the button. After identifying those states (accounting for about 40% of all registered voter in the U.S.) that provided, within their publicly available voting records, voters’ first name, last name, and birth dates, 1 out of 3 users was

²²⁵ It is important to note that this clause was added in the Facebook’s privacy policy version of May 2012.

²²⁶ See: <https://research.fb.com/> .

²²⁷ See for instance: Kramer & Chung (2011); Bernstein, Bakshy, Burke & Karre (2013); Bakshy, Messing & Adamic (2015); Hobbs & Burke (2017).

matched to its actual real-world voting behaviour. Again, results showed that people who was directly mobilized (by seeing also pictures of friends) were more likely to vote than the rest of the sample, thus generating additional 60.000 votes to 2010 elections.

This applied also to friends and friends of friends of social message's recipients, even though they were not themselves recipients: social contagion among friends would have led to further higher turnout, yielding other 280.000 actual votes. Since Facebook "likes", which can be considered effortlessly available digital records (and indicators) of people's behaviour, can be used to *«automatically and accurately predict a range of highly sensitive personal attributes including: sexual orientation, ethnicity, religious and political views, personality traits, intelligence, happiness, use of addictive substances, parental separation, age, and gender»* (Kosinski, Stilwell & Graepel (2013, p. 5802), it is not unreasonable to think that a platform that would want to manipulate election results could easily rely on such inferences. After all, expertise of companies specialized in Big Data analytics and psychometrics profiling have been (Issenberg, 2012; Wagner, 2016; Bright, 2017; Neely, 2017) and are likely to be increasingly recruited in political leaders' election campaigns.

Facebook proved to be able to play a not negligible part in influencing its users' engagement in specific "real-world" decisions and behaviours not only in the field of political mobilization but also in that of health, encouraging organ donation by allowing users to make their status as organ donors visible in their profiles, which resulted in an impressively positive short-term response²²⁸. But what if the world's bigger social network attempts, without your explicit and informed consent, to alter your emotions in order to test whether the *«exposure to friends' negativity might lead people to avoid visiting Facebook»*²²⁹? Such a psychological experiment took place on January 2012 and results were packed in Kramer, Guillory & Hancock (2014). The purpose was to evaluate *«whether exposure to emotions led people to change their own posting behaviours, in particular whether exposure to emotional content led people to post content that was consistent with the exposure»* (Kramer et al. 2014, p. 8788). To do this, News Feed algorithm of a randomly chosen sample of 689.000 Facebook's users was tweaked for one week, displaying to half of the sample fewer friends' positive emotional content, and fewer negative posts to the other half. Researchers found that, when negativity was reduced, a larger percentage of words in people's status updates were positive, and vice versa. The study proved therefore that emotional states can be transmitted to others via social networks, demonstrating for the first time that *«in-person interaction and nonverbal cues are not strictly necessary for emotional contagion»* (ivi). Critics and outrage reactions that spread throughout the press, the civil society, and the academic world just after the work went public, were motivated by to sets of circumstances. Firstly, the experiment was conducted in the absence of an Institutional Review Board (IRB)²³⁰,

²²⁸ See:

http://www.hopkinsmedicine.org/news/media/releases/the_facebook_effect_social_media_dramatically_boosts_organ_donor_registration .

²²⁹ Statement by Adam Kramer, the Facebook's data scientists who conducted the experiment along with two researchers from Cornell University's Departments of Communication and Information Science. Full text available at: <https://www.facebook.com/akramer/posts/10152987150867796> .

²³⁰ See: <http://mediarelations.cornell.edu/2014/06/30/media-statement-on-cornell-universitys-role-in-facebook-emotional-contagion-research/> .

namely was not submitted to a prior and mandatory required²³¹ assessment of the methods proposed for all those researches involving humans subjects, in order to ensure that they respect ethical standards. The reason behind this negligence would have been the fact that Cornell professor Jeffrey Hancock – an author of the study – analysed results only after Facebook had been independently run the experiment, meaning that Cornell University was not directly engaged in it. Here it comes the second criticism.

Whether or not an IRB should have been carried out, the authors of the study had declared in plain terms that it was «*consistent with Facebook’s Data Use Policy, to which all users agree prior to creating an account on Facebook, constituting informed consent for this research*» (*ibidem*, p. 8789). Indeed, Facebook updated its policy²³² to specifically comprise verbiage about handling users’ data for research only four months after the experiment happened, following an audit of Facebook Ireland Ltd.²³³ opened in 2011 by the Irish Data Protection Commissioner²³⁴. In October 2014, Facebook’s Chief Technology Officer Mike Schroepfer admitted²³⁵ that the research should “*have benefited from more extensive review by a wider and more senior group of people*” and failed to communicate clearly for what purpose and by which techniques it was realized. He also announced the introduction of a new framework of rules - including guidelines for researchers and a panel of experts in charge for human-related researches’ reviews – to which Facebook will abide by in the future, and he concluded with the following reassuring promise: “*We want to do research in a way that honours the trust you put in us by using Facebook every day. We will continue to learn and improve as we work toward this goal*”.

4.3.5 Alternative approaches

Author: Ricard Espelt and Enric Senabre Hidalgo

When considering how to approach Facebook alternatives, we must separate the social networking and instant messaging function, especially after Whatsapp acquisition by Facebook.

In terms of social networking, Diaspora²³⁶, founded in 2010 by four students at New York University’s Courant Institute of Mathematical Sciences, runs under a Creative Commons Attribution 3.0 Unported License, one of the first attempts raised to create an alternative to Facebook as a social network. The project is based in three characteristics: decentralization, freedom and privacy.

²³¹ As established by the Common Rule, the set of federal regulations for ethical conduct of human-subject research, recently updated and applying to 17 Federal agencies and offices. Among them, the Department of Health and Human Services (45 CFR Part 46). See: <https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html> .

²³² See: <https://newsroom.fb.com/news/2012/05/enhancing-transparency-in-our-data-use-policy/> .

²³³ Facebook’s European head office is based in Dublin and is responsible for the processing of non-U.S. user data.

²³⁴ Full report available at: <https://www.dataprotection.ie/documents/facebook%20report/final%20report/report.pdf> .

²³⁵ See: <https://newsroom.fb.com/news/2014/10/research-at-facebook/> .

²³⁶ See: <https://diasporafoundation.org/> .

- Decentralization: Instead of everyone's data being held on huge central servers owned by a large organization, the platform exists on independently run servers ("pods") all over the world. Everyone chooses which pod to register with, and then they can then connect seamlessly with the diaspora community worldwide.
- Freedom: Users have control over their profile. Thus, unlike the majority of social networks, user doesn't have to use their real identity. The user can interact with people in whatever way they choose. Diaspora is also Free Software engineering, giving the liberty over how anyone use it.
- Privacy: Everybody has the control over their own data. Anyone must sign over rights to a corporation or other interest who could use it. In addition, everybody chooses who sees what their share.

The project started as one of the most successful crowdfunding campaigns on Kickstarter in 2010. Currently the entire network is syndicated, from individual pods to p2p clients, and privacy aware. Whatever content user's share, goes to all their contacts eventually. The most populated pods can have thousands of users. Diaspora software development is managed by the Diaspora Foundation, which is part of the Free Software Support Network (FSSN), which acts as an umbrella organization to technological development and manages Diaspora's branding, finances and legal assets. The revenue streams for Diaspora include decentralised direct donations for pods administrators, volunteers and other people outside the foundation like open source developers which want to work on specific features, via the Bounty Source²³⁷ or Liberapay²³⁸ platforms²³⁹.

Building on this work, there have been different efforts regarding the creation of open social standards, including decentralised and federated social networking documented and tested within the D-CENT project (Halpin, H., Bria, F. 2014)²⁴⁰

Another alternative to Facebook is Libertree²⁴¹, a Free Libre Open Source software (FLOSS) that lets people create their own social network free from commercial influence and surveillance, such as behaviour tracking, user profiling, advertising, data mining and analysis, and covert information filtering.

Regarding instant messaging and privacy issues²⁴², Line²⁴³ is currently the most important competitor to Facebook in number of users. This freeware app allows users to exchange texts, images, video and audio, and conduct free VoIP conversations and video conferences. The service is operated by Line Corporation, a Japanese subsidiary of the South Korean internet search giant Naver Corporation. In July 2016, Line Corporation turned on end-to-end encryption by default for all Line users. It had earlier been

²³⁷ See: <https://www.bountysource.com/> .

²³⁸ See: <https://liberapay.com/> .

²³⁹ More information: <https://wiki.diasporafoundation.org/Donations> .

²⁴⁰ https://dcentproject.eu/wp-content/uploads/2014/02/D4.1-State-of-the-Art_new_2.pdf

²⁴¹ See: <http://libertree.org> .

²⁴² MTE (2017), 8 *Alternatives to Whatsapp that Actually Respect Your Privacy*, <https://www.maketecheasier.com/alternatives-to-whatsapp/>

²⁴³ See: <https://line.me/en/> .

available as an opt-in feature since October 2015. The app uses the ECDH protocol for client-to-client encryption. In August 2016, Line expanded its end-to-end encryption to also encompass its group chats, voice calls and video calls²⁴⁴.

In terms of security, Wickr Me²⁴⁵ is one of the most valued alternatives. With this technology, users can instantly connect with other users in groups or 1:1, share end-to-end encrypted messages, files, photos and videos with full control over who has access to personal content and how long it remains accessible.

Provably, Telegram is, in terms of wide adoption, the most relevant alternative to Whatsapp. This non-profit cloud-based instant messaging service is open-source software but the source code for recent versions is not always immediately published, whereas its server-side code is closed-source and proprietary. The service also provides APIs to independent developers²⁴⁶.

Kontalk²⁴⁷, Tox²⁴⁸, Signal²⁴⁹, Threema²⁵⁰ and Kakao Talk²⁵¹ are other alternatives to Whatsapp service, removed from any sort of Facebook control.

²⁴⁴ More information: [https://en.wikipedia.org/wiki/Line_\(software\)](https://en.wikipedia.org/wiki/Line_(software))

²⁴⁵ <https://www.wickr.com/home2>

²⁴⁶ More information: [https://en.wikipedia.org/wiki/Telegram_\(messaging_service\)](https://en.wikipedia.org/wiki/Telegram_(messaging_service))

²⁴⁷ <http://kontalk.org>

²⁴⁸ <https://tox.chat>

²⁴⁹ <https://signal.org>

²⁵⁰ <https://threema.ch/en>

²⁵¹ <https://en.wikipedia.org/wiki/KakaoTalk>

4.4 On-demand platforms: the case of Uber

Author(s): Giulia Rocchi, Stefano Lucarelli and Elena Musolino

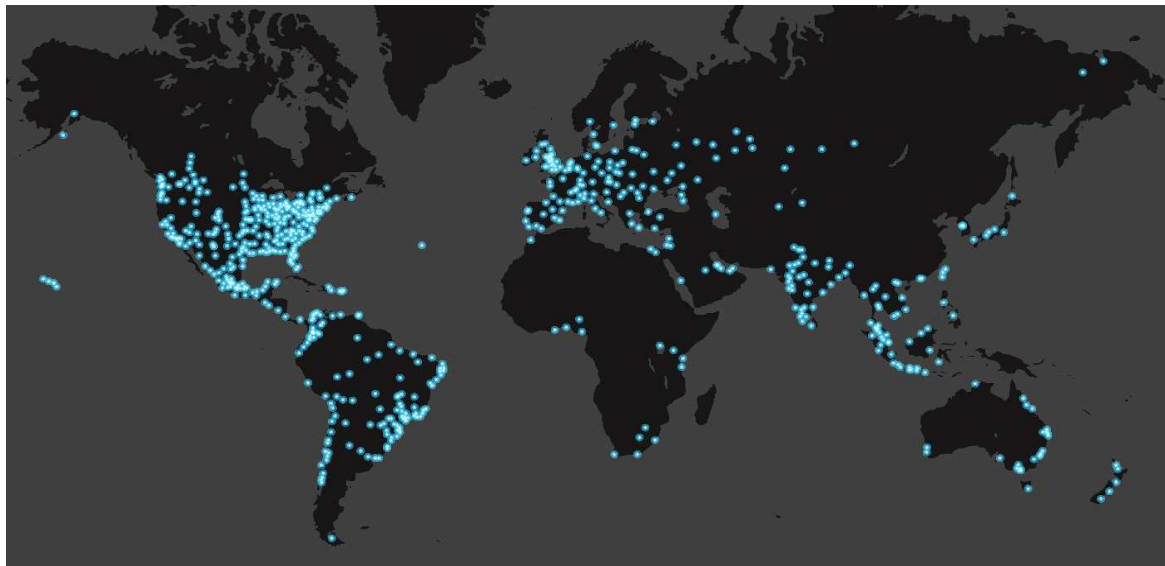


Fig.10: Uber's coverage worldwide

Source: UBER Engineering (<https://eng.uber.com/ipv6/>)

With its service available in 84 countries and 737 cities²⁵² and five billion rides reached in mid-June 2017²⁵³, Uber seems presently to be the most promising and disrupting transportation network company worldwide. Uber is perhaps the most notorious amongst a sizeable bunch of “asset-less” platforms that have popped up since the financial crises began in 2007 and that operate through a hyper-outsourced model, whereby workers, fixed capital, maintenance costs, training are outsourced (Srnicek 2017).

This privately-held on-demand mobility platform is currently valued \$68 billion²⁵⁴ (roughly twice Airbnb's valuation and almost ten times that of Lyft, Uber's American biggest competitor) and has comprehensively raised more than \$11.5 billion from a total of 85 investors²⁵⁵, which include, amongst other notable names, Google Ventures, Goldman Sachs and Amazon. Between January 2010 and April 2015 on-demand mobile services saw an exponential growth in VC funding, raising \$13.2 billion as a whole: in 2014 Uber outstripped all the other start-ups by 39%²⁵⁶. In 2015 Uber, Didi Chuxing (Uber's Chinese equivalent, which acquired Uber China in mid-2016 after a costly year-long battle for supremacy (Russel, 2016)), and Airbnb captured together 59% of on-demand yearly global funding²⁵⁷.

²⁵² See: <https://uberestimator.com/cities> .

²⁵³ See: Holt, Macdonald & Gore-Coty (2017).

²⁵⁴ See: <https://www.statista.com/statistics/407888/ranking-of-highest-valued-startup-companies-worldwide/> .

²⁵⁵ See: <https://www.crunchbase.com/organization/uber> .

²⁵⁶ See: <https://www.cbinsights.com/research-on-demand-report> .

²⁵⁷ See: <https://www.cbinsights.com/research/on-demand-funding-top-companies/> .

The company has been registering consistent losses (Newcomer, 2016) since its infancy, as a result of a strategy aimed at creating a matchless marketplace and beating competitors on pricing by cutting ride fares on the one hand and subsidizing drivers on the other (Somerville, 2017) - being then, in order to stay afloat, compelled to raise the commission it retains from its partners (Edwards, 2017) and to charge higher prices to customers who seem “willing to pay more” on the basis of their historical ride data (Kominers, 2017)²⁵⁸ -, and by investing in aggressive geographic expansion as well as in research and development, especially in the areas of mapping (Morris, 2016) and driverless cars technologies (Dillet, 2016).

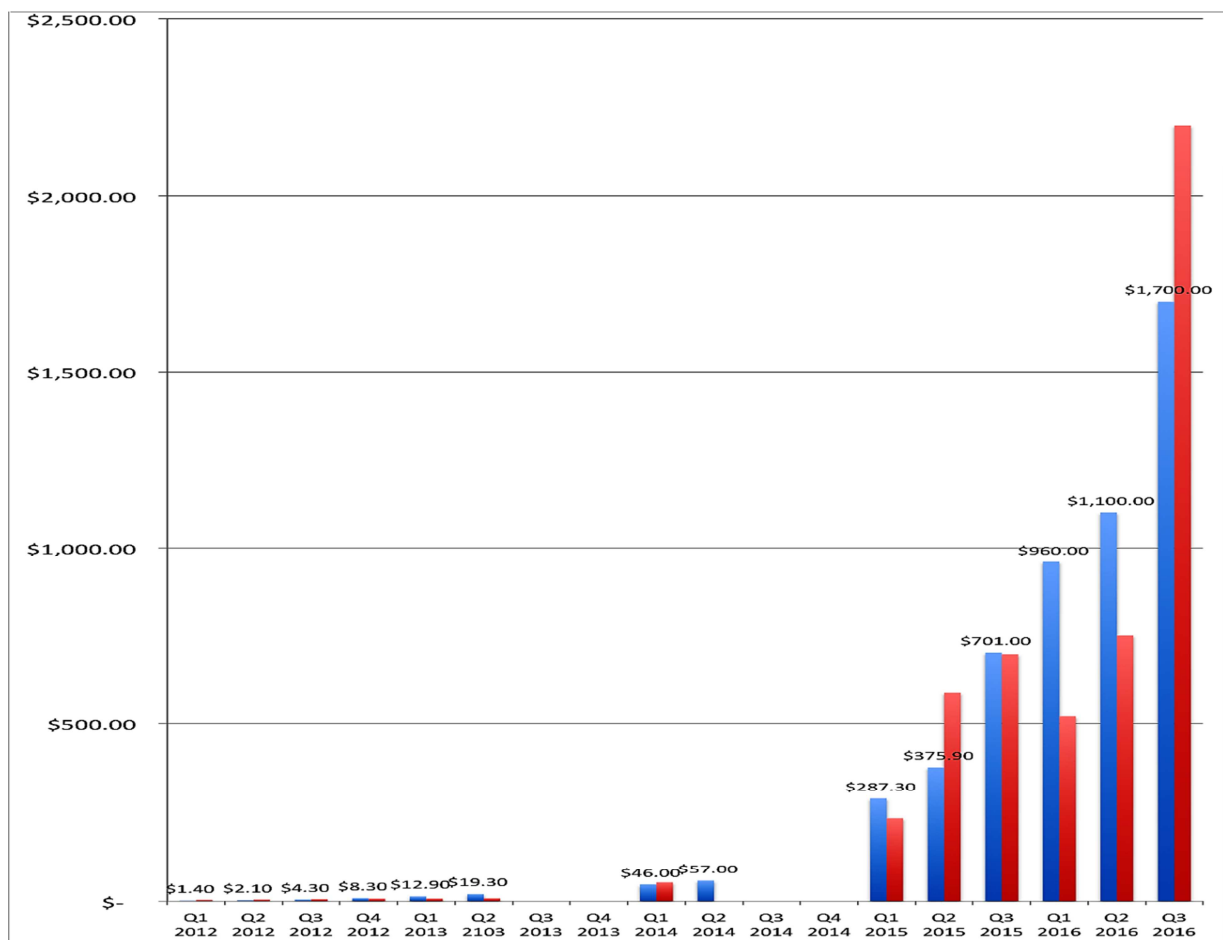


Fig. 11: Uber’s net revenues (in blue) vs its losses (in red) by quarter²⁵⁹- in million U.S. dollars

Source: Business Insider (<http://uk.businessinsider.com/uber-leaked-finances-accounts-revenues-profits-2017-2?IR=T>)

²⁵⁸ «Uber has been experimenting with price discrimination, using its huge stores of personal data to make judgements about whether a passenger would be willing to pay more for a journey. Factors like whether they frequently travel from affluent area to affluent area, are frequently being picked up outside business addresses (indicating they may be charging the ride to an expense account), or how much battery life their phone has, have been used to influence the price Uber charges its customers». See Symons & Bass (2017), D1.7 for DECODE project, p. 22.

²⁵⁹ Although has recently started to do it, as a private company, Uber is not required to publicly disclose its financial information. Therefore, data used to create this diagram has been partially leaked, while blank spaces indicate missing data for those quarters.

Nevertheless, its second-quarter financial results for the current fiscal year show that its revenue growth is progressively outpacing losses and the number of global trips through its app increased 150% year-over-year, with a pick of 250% growth in developing markets (Primack, 2017).

Uber thus appears to still be financially healthy, despite the scandals and controversies of any kind that - although having marked the Californian company since its foundation - have insanely multiplied in the last year (Bhuiyan, 2017), leading Uber's co-founder and chief executive officer Travis Kalanick (in August replaced by former CEO of Expedia Dara Khosrowshahi) and several other senior executives to resign from their positions in June 2017 (Dwoskin, 2017).

4.4.1 General description

Uber's alleged belonging to the ecosystem of the so-called and publicly debated "sharing economy"²⁶⁰ is a controversial issue. Actually, controversial, fragile and contradictory is the "sharing" discourse itself, which, endemically embedded with promises of altruism, inclusion, reciprocity, and environmental awareness, tends to be applied indiscriminately to transactional and non-transactional platforms, allowing the former to be aligned with (and benefit from) characteristics of the latter. In fact, not only has the term "sharing" been improperly used by the press to refer to extremely heterogeneous practices where economic incentives appear to exceed sustainability and social motivations²⁶¹ to engage in such not novel but surely tech-boosted trends - questioning moreover the apparently indisputable benefits that should stem from them²⁶² -, but even when this revamped economy is labelled with the less deceiver term of "collaborative" - as the European Commission did in a recent Communication²⁶³ intended to address this ever increasingly profitable²⁶⁴ phenomenon -, still seems Uber not to comply with a definition that describes "collaborative platforms" as mere intermediaries «*that connect - via an online platform - providers with users and that facilitate transactions between them*» (COM/2016/0356, p. 3). What is incontestable is that new digital technologies are converting everything - whether it be underused assets with high degrees of idle capacity or not - in exploitable resources, muddling boundaries that were well-marked until recently, like those between private and professional spheres - since labour and service offering resizes and commercializes activities that were traditionally recognized as "confidential" such as giving a ride or lending money-, as well as those between dependent and independent employment, or even work and leisure.

²⁶⁰ To designate these new business models as part of the wider scenery of the digital platforms' revolution, the word "sharing" is the most popular among an assortment of several other expressions, which have qualified this disruptive economy as "gig" (Friedman 2014), "mesh" (Turi et al., 2016), "platform" (Kenney & Zysman, 2016), "peer-to-peer" (Belotti et al., 2015), "on-demand" (Berg 2016).

²⁶¹ See for instance: Hamari, Sjöklint & Ukkonen (2016); Belk (2014); Munoz & Cohen (2017).

²⁶² See for instance: Thomas (2003); Bardhi & Eckhardt (2012); Schor (2014); Edelman & Luca (2014); Schor (2017).

²⁶³ COM/2016/0356, *A European agenda for the collaborative economy*.

²⁶⁴ PwC estimated that the five key sectors (peer-to-peer accommodation, peer-to-peer transportation, on-demand household services, on-demand professional services, and collaborative finance) of the collaborative economy they have assessed in their study, facilitated €28 billions of transactions within Europe in 2015 and generated revenues of nearly €4 billion, this latter figure expecting to globally reach \$335 billion by 2025. Vaughan & Daverio (2016).

This premise was necessary to legitimize our preference to designate Uber as an on-demand ride-hailing (rather than a ride-sharing²⁶⁵) company that, headquartered in San Francisco as all the tech-giants we have analysed so far, was first conceived as a “limo timeshare service” during an international technology conference in Paris in 2007 by entrepreneurs Garrett Camp and Travis Kalanick, in search for the next big startup idea after just having sold respectively StumbleUpon to eBay and Red Swoosh to Akamai (Kalanick, 2010). In 2009, while Uber app prototype was coming along, Kalanick was hired by Garret as Chief Incubator, in charge of getting the project off the ground (Kalanick, 2010). Uber’s first test in New York - with just three cars cruising the Soho/Chelsea/Union Square areas - was quickly followed by the official launch in San Francisco in late May 2010 (Kalanick, 2010).

With the introduction of UberX in 2012 (Tsotsis, 2012) the company pivoted from being a high-end provider of luxury black cars driven by well-dressed professionals into a low-end matching platform for any driver with a vehicle satisfying Uber’s safety and quality requirements and holding a private hire driver licence, with this last requisite contingent upon each local/national authority.

As a result of this change, Uber’s technology-enabled network - composed of self-employed drivers utilizing their private cars and using their Uber app to connect to the closest ride requester, pick him up and take him to destination, with fares calculated and charged in a cashless, automated way - expanded all over the globe, systematically clashing, as we will see in section 4.4.4, with well-established and regulated real economy’s taxi industries²⁶⁶.

From the seemingly less controversial viewpoint of the demand-side, along with search and transaction costs essentially eradicated, more affordable prices, and greater “hailing” speed and comfort, another reason for the success of Uber is a high level of service customization. UberX is in fact only a slice of a vast array of services which encompasses *inter alia*: UberBlack (“the original Uber”), UberXL (the six passenger version of UberX), UberSUV (the premium luxury version of UberXL), UberFamily (with car seats for children), UberGREEN (for an eco-friendly ride), Uber TAXI (a regular metered cab registered also on Uber’s system), UberPOOL (the latest Uber’s product that allows riders to share their trip with other passengers headed in the same direction), et cetera. Services’ availability vary widely depending on the city where the company operates: by looking even only to North America, where while New York’s offering includes seven different types of services²⁶⁷, Ottawa shows just three options²⁶⁸, one less than Portland²⁶⁹, as a way of example.

²⁶⁵ As stated by the Court of Justice of the European Union, «Uber does not offer a ride-sharing service, since the destination is selected by the passenger and the driver is paid an amount which far exceeds the mere reimbursement of costs incurred». Court of Justice of the European Union, PRESS RELEASE No 50/17 Luxembourg, 11 May 2017, Advocate General’s Opinion in Case C-434/15, Asociación Profesional Elite Taxi v Uber Systems Spain, SL. Available at: <https://curia.europa.eu/jcms/upload/docs/application/pdf/2017-05/cp170050en.pdf>.

²⁶⁶ The regulation of taxi services generally implicates: (i) control of entry, with local authorities deciding the maximum number of taxis/taxi companies operating and competing with each other in a given area, with a subsequent limited number of granted licences; (ii) licensing and performance requirements for both single drivers and taxi companies to guarantee safety standards with regular drivers’ trainings and vehicles’ inspections *inter alia*; (iii) financial responsibility requirements (namely a proper insurance); (iv) the setting of maximum rates. See Geradin (2015).

²⁶⁷ <https://www.uber.com/en-IT/cities/new-york>.

²⁶⁸ <https://www.uber.com/en-IT/cities/ottawa>.

²⁶⁹ <https://www.uber.com/en-IT/cities/portland>.

Beyond meeting age, driving licence, legal residence, and insurance requirements, candidates have to undergo a Motor Vehicle Record review and a criminal background check²⁷⁰, as well as a vehicle inspection covering basic mechanical and safety features²⁷¹. All users must create an account through the Uber application and provide their name and phone number in order to be enabled to enter their pickup location and tap a ride request. When a driver accepts the request, the user is notified by the app, which also displays driver's profile together with the estimated fare that will be automatically charged, once the ride has been completed, to the bank card the user had entered at the time of registration. The app also incorporates a bilateral anonymized one-to-five star ratings system which enables passengers to rate drivers, and vice versa, serving both as a kind of mutual trust principle and «*a non-negotiable prerequisite for participation and inclusion (...), unevenly generating the perception of trust and security but with detrimental and punitive effects on certain parties*» (Cockayne 2016, p. 79). Indeed, an average score falling below a certain threshold may lead, after multiple warnings, to permanent deactivation of drivers' accounts²⁷².

Uber also offers promotions to both its drivers and riders, which generally consist of free ride credit codes for newcomers in the latter case. With regard to drivers, promotions are monetary benefits which are granted as long as specific tasks are fulfilled. Drivers are required for instance to complete a given number of trips, stay on-line in a certain time slot, accept the greatest possible number of trips, or refer new people as new drivers to Uber²⁷³.

Uber has not confined its real-time demand-supply matching strategy to the ride-hailing sector. In 2014 Uber begun testing a service called UberFRESH, providing on-demand meals in the trial area of Santa Monica (Etherington, 2014). Renamed UberEATS²⁷⁴ the next year for its first launch outside of the United States in Barcelona and made available as a standalone application, it is currently usable in over 50 cities of 13 countries around the world²⁷⁵. Just as with other food delivery platforms like Deliveroo and Grubhub, UberEATS's customers can choose their dishes scrolling through a list of partnered restaurants and take-out stores, monitor the journey of their meal as it is prepared and then picked up by a nearby Uber partner who will deliver it at the selected address using its car, scooter, bike, or on foot.

In mid-May 2017 (Davies, 2017) Uber announced the launch of Uber Freight²⁷⁶, an app that pairs up trucking companies (including independent operators) with shipping firms. Within a few months, the service expanded from Texas into other six American States and the app was personalized with new features that '*automatically learn drivers' preferences based on their past loads, their location, their home base, and more*' (Driegert, 2017).

²⁷⁰ See: <https://help.uber.com/h/6970e704-95ac-4ed3-9355-e779a86db366> .

²⁷¹ See: <https://help.uber.com/it/h/6bf626ef-aec0-4d94-9739-e8cd3d7c12b3> .

²⁷² See UBER Community guidelines: <https://www.uber.com/legal/community-guidelines/us-en/> .

²⁷³ <https://help.uber.com/h/2aa91e41-f139-4b4a-bfce-bf36c00ebc60> .

²⁷⁴ <https://newsroom.uber.com/us-california/uberfresh-is-now-ubereats/> .

²⁷⁵ <https://help.uber.com/h/3f8de61e-09dd-4844-afb2-749c9ffc65a8> .

²⁷⁶ <https://freight.uber.com/> .

4.4.2 Uber's business model

We put aside for the time being the long-standing controversy of whether Uber should be treated, as the company claims²⁷⁷, as an information society service provider which relies on electronic means to intermediate and facilitate direct exchange between actors (in this case falling within the provisions of the e-commerce directive²⁷⁸) or rather should it be considered and regulated, as suggested in the recent non-binding opinion issued by Europe's highest court, as a transport company (falling instead within the normative framework of the Services Directive²⁷⁹).

Uber is undoubtedly a matchmaking platform whose main source of profit results from the withdrawal of a commission fee from the total fare of every ride completed by its "driver-partners" (Hall & Krueger, 2015). Averagely, 70/80% of gross fares ends up in the hands of drivers (Henten & Windekilde, 2015). Fares are inclusive of applicable taxes where required by law, automatically set by Uber's pricing algorithms and calculated by taking into account the type of car chosen and a base amount to which are added additional rates - which vary from city to city - based on mileage and duration of the route. Drivers are required to have a car insurance and Uber provides, under certain conditions, a supplemental liability coverage up to \$1 million to drivers and passengers.

Uber's commission-based pricing system, powered by complex Big Data analytics to gain rich insights into customers' information²⁸⁰ in order to predict demand and supply variations, integrates a "dynamic pricing" feature which makes fares temporarily surging during peak periods, when demand exceeds supply capacity. In this way «*information collected and processed by the platform effectively substitutes for an auction mechanism*» (Einav et al. 2015, p. 7). By offering more money to drivers, Uber is thus able to ensure the availability of quick and reliable rides, considerably lowering the percentage of unfulfilled requests and maximizing at the same time its own revenues. As explained in Uber's dedicated section²⁸¹, surge rates 'are charged as a multiplier of X.X. For example, a rider in a surging area may see and accept a surge multiplier of 1.3x or 2.1x. This surge multiplier applies to the base, time, and distance of the trip fare. Cancellation fees, tolls, and per-trip surcharges are not subject to surge pricing'. A trip fare of \$10 with a surge rate of 1.5x will amount therefore to \$15. Other sources of profit come from the booking fee²⁸² (a separate flat fee covering Uber's regulatory, safety, and operational costs), trip cancellation fees²⁸³ charged to riders and whose amounts vary by vehicle class and city, as well as tool, airport, and cleaning commissions.

²⁷⁷ «Unless otherwise agreed by Uber in a separate written agreement with you, the Services are made available solely for your personal, non-commercial use. You acknowledge that your ability to obtain transportation, logistics and/or delivery services through the use of the services does not establish Uber as a provider of transportation, logistics or delivery services or as a transportation carrier». UBER, Terms and Conditions, 23/03/17, <https://www.uber.com/legal/terms/us/>.

²⁷⁸ Directive 2000/31/EC, available at: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:32000L0031>.

²⁷⁹ DIRECTIVE 2006/123/EC, available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32006L0123>

²⁸⁰ For an overview of the purposes for which Uber collects (and share) data through its services and additionally gathers other kinds of data from third party sources, see UBER's Privacy Policy, available at: <https://privacy.uber.com/policy>. For an example of an Uber data-driven demand-supply forecasting model see: Laptev, Smyl & Shanmugam (2017),

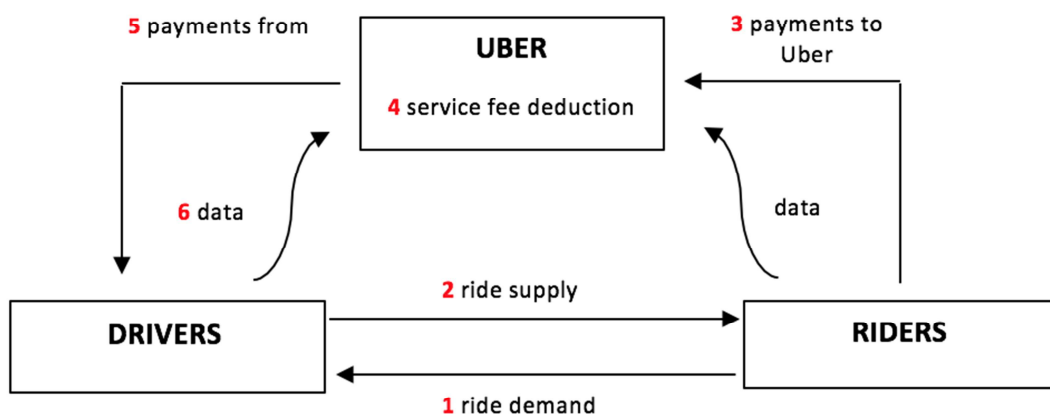
²⁸¹ See: <https://help.uber.com/h/e9375d5e-917b-4bc5-8142-23b89a440eec>

²⁸² <https://help.uber.com/it/h/3cb756e0-b25f-4196-b3c0-5ea4bf727f26>

²⁸³ <https://help.uber.com/h/eebc0564-5228-4d70-997c-0fe63f0753c2>

As part of its “180 Days of Change” campaign (Schildkrout & Hol, 2017), started in June 2017 and only applying to U.S. drivers so far, Uber announced a series of changes and improvements aimed at enhancing the much vaunted flexibility the company claims it has always granted to its partners: «*We want everyone who drives with Uber to truly feel that their day belongs to them, that they can earn when and how they want, and that Uber is always there for them*» (Schildkrout and Holt, 2017). Under the frame of this renovation - which is occurring after the above mentioned long sequence of “missteps” that the ride-booking company has been accused of committing since the beginning of 2017 and which comprises allegations of trade secret theft (Bergen, Mehrotra, 2017), espionage of competitors (Hern, 2017), law enforcement circumvention (Isaac, 2017), and sexist enterprise culture (Kuchler, 2017) - fall the introduction of tipping, a per-minute rate charged to tardy riders, and an extra fee to passengers when drivers have to travel more than a time lapse between eight and eleven minutes to pick them up.

4.4.3 Value creation model: a simplified framework



1 After downloading the Uber app and creating a rider account, the user types its destination address in the “Where to?” box. The pickup point can be modified in the event that it is different from the address set by default to user’s current GPS location. Fare estimates are displayed below each vehicle option the user can choose from. The surge price multiplier is notified to be active either by a statement saying that “Fares are higher due to increased demand”, or by an upfront fare which is showed and accepted in advance, calculated on the basis of estimated time, distance, traffic conditions and demand. The rider taps the “Request” button and wait for a driver to accept his request. Trips can also be scheduled form 15 minutes to 30 days in advance.

2 The request is matched with and confirmed within 15 seconds by a nearby driver, whose location can be monitored by the rider. This latter is notified by its app when his vehicle is about one minute away from the pickup location and may be called or texted by its driver in case of problems. The trip can be canceled if the customer delays by 2-5 minutes. As soon as a trip ends, riders and drivers are no longer able to contact each other through the app. Once the trip is completed, passenger and driver are asked to rate each other. In both cases, if the score assigned is less than 5 stars, a list of

common issues from which they can select the most appropriate is shown. Among this list are certain issues that, being impossible to be considered as driver's faults, will not affect his overall rating. When a trip is canceled, neither the rider nor the driver will be able to leave a rating.

3 The cost of the ride is automatically charged to the payment method the user has previously linked to his account. Cash option is available in a limited number of cities.

4 Uber withholds a variable commission, seemingly between 20% and 30%, which should be applied²⁸⁴ to the fare amount after deduction of sales tax.

5 The remaining fee percentage is destined for drivers, who receive their compensation at weekly intervals. Expenditure on fuel, insurance, and vehicle maintenance, as well as self-employment and income taxes, shall be borne by themselves. As freelancers, Uber's drivers are not entitled to receive unemployment and health benefits, minimum wage, mandatory overtime, and other rights.

6 Drivers and riders provide Uber with location, transaction, device, log-history, app usage, text messages, and calls information which are parsed, sorted and configured in the context of an algorithmic decision-making system. Uber relies also on data collected by Uber's business partners through which users access their Uber app, as well as on insurance/financial/marketing/transportation companies data, and other publicly available information. The company is thus able to anticipate demand patterns and ceaselessly improve its services, representing at the same time an invaluable source of insights for city planners and policy makers as regards adoptable solutions to urban growth, traffic congestion, and greenhouse gas emissions.

4.4.4 Risks connected to the current value creation model

According to academic literature (e.g. Dyal-Chand 2015; Rogers 2015; Rauch and Schleicher 2015; Lobel 2016), Uber, the most famous ride-hailing start-up in the world - in a similar but surely more rowdy way with comparison to other corporates belonging to the eclectic market of the "sharing economy" - has generated several controversies. Disputes can be distributed along at least five essential interrelated dimensions:

1) The first one relates to the accusations of anticompetitive behaviour which have been brought from every corner of the globe by taxi companies, whose business has been flooded by a mass of private drivers who don't have to abide with their same complex licensing requirements;

2) A second one involves Uber's vast trove and possible misuse of its millions of users' information; 3) Safety concerns, stemming from the non-professional nature which usually characterizes the service offered, represents a third cause of potential harm in a consumer-focused perspective (Carson, 2016; Levin, 2017; Khan, 2017; Roof, 2017);

4) Whether Uber's drivers shall be deemed and treated as mere partners or employees is the most argued issue, subject of both political debate and lawsuits all around the world²⁸⁵.

²⁸⁴ Uber has recently confessed that, at the cost of tens of millions of dollars to its New York drivers, it has calculated and withheld its commission fee on the gross fare - thus before deducting sales tax - for two and a half years. Tens of thousands of Uber's driver-partners are eligible for a \$900 refund each. Uber has also been able to avoid paying value added tax on the booking fees it charges drivers in the UK by exploiting a loophole in how VAT is collected in Europe for business-to-business sales. See: Scheiber (2017) and Bergin (2017).

²⁸⁵ Especially in the case of Uber, the debate about deteriorating workers' conditions is still open. See: Isaac and Singer (2015); Court of Justice of the European Union, PRESS RELEASE No 50/17 Luxembourg, 11 May 2017,

5) Finally, controversies about tax liabilities (Williams-Grut, 2015; Sabah, 2016; Kunashegaran; 2017).

As we have previously explained (see paragraph 4.1), we will restrict our notes to Uber's competition and privacy/data protection contentions.

A relevant source for the description of the social, economic and legal impact of Uber and analogous Transportation Network Companies (TNCs) is a work realized in 2015 by the Committee on Transport and Tourism of the European Parliament (Azevedo & Maciejewski, 2015). The main objective this work tries to achieve is to determine if these new app-based services and platforms owe their success exclusively to innovation or rather to exploitation of loopholes in regulatory provisions. In the first case, regulatory restrictions to the field of TNCs could be rightly perceived as attempts of protection of traditional incumbent transport operators, that are characterized by high barriers to entry²⁸⁶; in the second case, they would originate from legitimate concerns over proper regulation of transportation services and consumer safety guarantee. From a legal viewpoint, the contribution highlights that Uber's business model is triggering different types of questions that cannot be properly addressed neither by existing European legislation nor within national legal systems because of two main novelties brought by TNCs into the legal landscape:

1) TNCs, as providers of information and communication technology (ITC) services, have a clear European dimension in an area where Member States were traditionally strongly opposed to European legislation, a European "competence" that also derives from the close interaction between ITC services and transport services in the case of TNCs. Indeed, these latter fall under European provisions on free movement of services (Art. 56 TFUE), freedom of establishment (Art. 49 TFUE) and they are part of the Digital Single Market. Moreover, if they are found – as have recently been²⁸⁷ – to provide transportation services, they could be affected also by European Union transport policy.

2) TNCs are difficult to get compatible with pre-existing national legislations, each one regulating its taxi industry on a stand-alone basis and without international ICT companies in mind. In fact, *«Member States can use general provisions on information and communication services as well as provisions on transport services, economic activity, taxation and labour law that were applicable to taxis with different legal qualifications of TNCs activities. TNCs could be qualified as ICT service providers or transport service providers if a functional link is determined between these ICT and transport services (with resulting permits or concessions applicable to transport services). Drivers may be considered as taxi drivers and/or independent economic operators of transport services (with resulting permits, local concessions/medallions, regulation applicable to taxi industry) or even employees (depending on the factual legal relationship between TNCs and drivers and the possibility for labour law to override contract provisions)»* (Azevedo and Maciejewski 2015, p. 6).

Advocate General's Opinion in Case C-434/15, Asociación Profesional Elite Taxi v Uber Systems Spain, SL., <https://curia.europa.eu/jcms/upload/docs/application/pdf/2017-05/cp170050en.pdf>; O'Connor & Ram (2017).

²⁸⁶ Where taxi licenses are tradeable – which depends on each Member State's national jurisdiction – their cost has risen substantially in recent years: in Spain a licence can cost up to 134,000 and in France even €240,000.

²⁸⁷ See: Court of Justice of the European Union, PRESS RELEASE No 50/17 Luxembourg, 11 May 2017, *Advocate General's Opinion in Case C-434/15, Asociación Profesional Elite Taxi v Uber Systems Spain, SL.*, <https://curia.europa.eu/jcms/upload/docs/application/pdf/2017-05/cp170050en.pdf>

A legal qualification of TNCs services²⁸⁸ that can work out under different jurisdictions at a State or even at a European level appears to be the most urgent matter to be solved, in order to avoid the substantial social costs of legal litigation which would result in a fragmented legislative landscape.

As shown in the table 4.5, the abundance of viewpoints on jurisdiction about Uber attests how its regulation represents an open issue.

COUNTRY JURISDICTION	CASE/COMPLAINT	VERDICT
Belgium	<p>2016: After a complaint by conventional taxi operator Taxi Verts, Brussels followed in the footsteps of other European capitals like Amsterdam, Paris, Madrid and Berlin, all of whom had ruled against the service before and in some cases have slapped the multi-billion dollar company with fines for operating illegally.</p> <p>Uber complied and turned its focus to UberX, a more expensive service which only uses professionally licensed chauffeurs who've passed an exam on local knowledge.</p> <p>By now the number of UberX users in the capital has caught up to the number of people that were originally using UberPop (about 50,000) before its forced stop. The company felt confident enough also to launch UberBLACK (in May 2016), with more luxurious cars and suited-up chauffeurs. Both</p> <p>UberX and UberBLACK are legal.</p>	<p>September 2016: The Brussels Court ruled that Uber had to shut down its most popular service in the European capital.</p>

²⁸⁸ A definition was provided by the California Public Utilities Commission in the context of a regulatory action with respect to Uber, Lyft and SideCar in 2013. A Transportation Network Company is described as «an organization whether a corporation, partnership, sole proprietor, or other form, (...) that provides prearranged transportation services for compensation using an online-enabled application (app) or platform to connect passengers with drivers using their personal vehicles». See: Decision 13-09-045, *Decision Adopting Rules and Regulations to Protect Public Safety while Allowing New Entrants to the Transportation Industry*, California Public Utilities Commission, 19 September 2013. Available at: <http://docs.cpuc.ca.gov/publisheddocs/published/g000/m077/k192/77192335.pdf>

<p>France</p>	<p>The French Parliament voted to outlaw UberPop and other similar services in 2014</p> <p>15 December 2014: Taxi drivers impeded morning traffic into Paris in a protest against Uber.</p> <p>March 2015: French police raided Uber's Paris offices and confiscated 1,200 cell phones, some computers and documents as part of an investigation begun in November 2014 into the UberPOP service and questions of whether Uber illegally retained customers' personal data, a French judiciary source said. The head of Uber France told the L'Obs magazine website he considered the raid heavy-handed and on thin legal ground.</p> <p>Uber continued to run the low-cost UberPOP service in France for several months after the ban, leading to a spate of violent protests by taxi unions in June that saw cars set alight and several Uber drivers and passengers attacked. The San Francisco-based company finally shut down UberPOP in July 2015.</p>	<p>The UberPop transport service banned from January 2015 to avoid unfair competition (Parisian taxi drivers say they must pay as much as \$270,000 for a license to operate).</p> <p>In December 2015 a French appeals court upheld charges against taxi app company Uber, fining it 150,000 euros (\$160,000) for "misleading commercial practices", arguing that Uber misrepresented UberPOP by claiming it was a ride-sharing service rather than a normal taxi service.</p>
---------------	--	--

	<p>April 2017: Uber is trying to fight back by sustaining French authorities handled the proceedings incorrectly because they did not inform the European Commission before pushing out this ruling.</p> <p>The ruling would not affect all of Uber's operations in the country. After the suspension of UberPOP, the company still works with professionally-licensed drivers in France.</p>	<p>In June 2016 a judge slapped Uber with a €800,000 fine for running the "illegal" UberPop service using unlicensed drivers. It also fined two of the company's senior executives a combined €50,000.</p>
GERMANY	<p>In 2014 a nationwide ban was instituted against Uber's UberPOP services after taxicab operators asked for an emergency injunction.</p> <p>Uber claimed in court that the company itself is only an agent to connect drivers and riders. Rules that apply to taxi services supposedly do not apply, and all services are deemed to be legal, according to Uber.</p> <p>Despite the ruling, an Uber spokesperson said that the company will not give up on Germany because UberBLACK and UberTAXI services will remain unaffected by the District Court's verdict. Both, UberBLACK and UberTAXI are using licensed taxis and limousine drivers.</p>	<p>On September, 2014 a Berlin court also upheld a ban imposed on the start-up that had banned it from operating across the German capital. As part of the decision, the Berlin court agreed with the local authorities, which ruled in August that Uber did not have the proper licenses or safety checks in place to operate in the city.</p> <p>In March 2015 a three-judge panel, Frankfurt Regional Court, Germany has issued a temporary injunction against Uber. German court banned Uber services if they used unlicensed drivers. The court ruled that Uber's business model clearly infringes the Personal Transportation Law because drivers transport riders without a personal</p>

		<p>transportation license. However, German law allows drivers to pick up passengers without a commercial license only if the driver charges no more than the operating cost of the trip. Drivers must carry a valid driving license, have necessary local permits, and undergo background checks before they pick up passengers. Because Uber stands to take a cut of any charges, the court held it liable and issued an injunction against the service. The Frankfurt regional court said each violation of the Uber order was subject to a € 250,000 (\$ 264,825) fine or a jail term of up to six months for a local employee, if it violated the temporary injunction. However, the district court of Frankfurt lifted the preliminary injunction imposed against the service UberPOP on 25 August 2014. The court reversed that decision, saying that although some of the taxi drivers' legal arguments against Uber were valid, the strict conditions needed to endowment an emergency injunction were not met.</p>
<p>ITALY</p>	<p>May 2015: A judge in Milan rules that Uber's Pop service creates "unfair competition" effectively holds the private company to the same standard as a public taxi service.</p> <p>April 2017: A Rome court ruled that Uber represents unfair competition for traditional taxis.</p>	<p>May 2015: The court in Milan said Uber could not use its apps in the country and could not promote or advertise its services, following legal action brought by Italy's traditional taxi unions.</p> <p>April 2017: Italy temporarily</p>

		blocked Uber earlier after finding its use of mobile technology amounted to unfair competition. Uber appealed the decision in the case, which was brought by major taxi associations, and the ban was annulled in May 2017.
NETHERLANDS	<p>Since December 2014, a handful of UberPOP drivers have been given stiff fines for violating the ban on unlicensed drivers.</p> <p>March 2015: two Amsterdam taxi drivers were arrested for reckless driving after blocking an Uber driver. Another Uber driver reported his car had been blocked and tires slashed.</p> <p>Uber continues to operate its UberPop peer-to-peer ride-sharing service in violation of the Dutch Court.</p>	<p>December 2014: a Dutch court banned UberPOP; it fell foul of licensing laws for commercial drivers. The Dutch court ordered fines of €10,000 for every driver caught providing the UberPop service.</p>
SPAIN	<p>Complaint by the Madrid Taxi Association, after taxi drivers strikes in protest at Uber (July 2014).</p> <p>March 2016: More than a year after being banned in Spain, Uber returns to the country with its official Madrid launch and a new tactic: compliance. However, Uber isn't going in gung-ho with its full suite of services, such as the controversial UberPop that lets anyone who owns a car become a driver. Madrid's tourists and residents will only be able to use professional, licensed drivers</p>	<p>9 December 2014: A judge had instructed Uber to cease operations after accepting <i>complaint</i> from <i>Madrid Taxi Association</i>. In his ruling on the temporary ban, the judge said Uber drivers didn't have official authorisation and accused the service of "unfair competition".</p>

	<p>through UberX.</p> <p>May 2017: Taxi drivers in Spain strike in cities including Madrid, Barcelona and Valencia to protest at what they see as the exploitative practices of ride-hailing transportation apps Uber.</p>	
UK	<p>2016: two Uber drivers, James Farrar and Yaseen Aslam, on behalf of a group 19 Uber workers argued that they were employed by the San Francisco-based firm, rather than working for themselves. The ride-hailing app could now be open to claims from all of its 40,000 drivers in the UK, who are currently not entitled to holiday pay, pensions or other workers' rights.</p> <p>Uber immediately said it would appeal against the ruling. Research by Citizens Advice has suggested that as many as 460,000 people could be falsely classified as self-employed, costing up to £314m a year in lost tax and employer national insurance contributions.</p> <p>September-October 2017: Outcry from a coalition of customers, government ministers and drivers at the ride-hailing company. The debate over Uber's future has divided Londoners, with more than 850,000 people signing a petition urging the mayor to revoke the decision. Uber's licence expired on 30 September, The firm can continue to operate in the capital – where it has 3.5 million users – until it has exhausted the appeals process, which could take months.</p> <p>Uber has lodged its legal appeal against Transport for London's decision not to renew its</p>	<p>October 2016: Uber drivers are not self-employed and should be paid the "national living wage", a UK employment court has ruled in a landmark case which could affect tens of thousands of workers in the gig economy (London employment tribunal).</p> <p>September 2017: Uber has been stripped of its London licence. The firm's application for a new licence in London was rejected by Transport for London (TfL) on the basis that the company is not a "fit and proper" private car hire operator. TfL said it had rejected the company's application to renew its licence because "Uber's approach and conduct demonstrate a lack of corporate responsibility" in relation to reporting serious criminal offences, obtaining medical certificates and driver background checks. The licensing body also said</p>

	<p>private hire licence, as the ride-hailing app steps up its campaign to keep operating in one of its biggest markets.</p> <p>November 2017: Uber challenged the ruling at the tribunal in central London, warning that it could deprive riders of the “personal flexibility they value”. It claims that the majority of its drivers prefer their existing employment status. The Independent Workers’ Union of Great Britain (IWGB), which backed the appeal, said drivers will still be able to enjoy the freedoms of self-employment – such as flexibility in choosing shifts – even if they have worker status.</p>	<p>it was concerned by Uber’s use of Greyball, software that can be used to block regulatory bodies from gaining full access to its app and undertaking regulatory or law enforcement duties.</p> <p>Uber has also been criticised over its treatment of drivers, and is awaiting a separate tribunal ruling over the employment status of what it terms “partners”.</p>
<p>Court of Justice For the European Union (CJEU), Advocate General’s Opinion in response to the Juzgado de lo Mercantil n° 3 de Barcelona (Commercial Court n° 3, Barcelona, Spain), 2014</p>	<p>This case originated in the Mercantil Court of Barcelona and was filed against Uber by an association of taxi providers, namely the Asociación Profesional Élite Taxi (APET). Several issues which arose in the case were then referred by the Spanish court to the CJEU as a request for preliminary ruling. The major issue referred was with regard to the legal nature of Uber’s activity, namely whether it should “<i>be considered to be merely a transport service or must it be considered to be an electronic intermediary service or an information society service</i>”.</p> <p>Issues/allegations raised APET claimed that Uber provided transport services in Spain without having the requisite permissions and was hence in contravention of the</p>	<p>2017: The Advocate General takes the view that, although it is for the national court to determine and assess the facts, the service in question is a composite service, since part of it is provided by electronic means while the other part, by definition, is not. A composite service may fall within the concept of ‘information society service’ where (1) the supply which is not made by electronic means is economically independent of the service which is provided by that means (as is the case, for example, of intermediation platforms for purchasing</p>

	<p>Spanish Competition law. It was contended that these infringements of regulations enabled Uber to gain an anticompetitive advantage over other taxi providers and drivers and its activities are in contradiction of Spanish Competition Law.</p> <p>Defence/counter-arguments On the contrary, Uber has contended that it is not a transport service provider. It claims that due to its technological and innovative business model, it is in fact an information society service provider. It is a platform or network industry provider which connects independent contractors (drivers) to consumers and has led to great benefit to the consumer.</p>	<p>flights or making hotel bookings) or (2) the provider supplies the whole service (that is, both the part provided by electronic means and the part provided by other means) or exercises decisive influence over the conditions under which the latter part is provided, so that the two services form an inseparable whole, a proviso being that the main component (or indeed all essential elements of the transaction) is supplied by electronic means (as is the case, for example, of the online sale of goods). According to the Advocate General, the service offered by Uber does not meet either of those two conditions. In that regard, the Advocate General observes that the drivers who work on the Uber platform do not pursue an autonomous activity that is independent of the platform. On the contrary, that activity exists solely because of the platform, without which it would have no sense. The Advocate General also points out that Uber controls the economically important aspects of the urban transport service offered through its platform. Indeed, Uber (i) imposes conditions which drivers must fulfill in order to take up and pursue the activity; (ii) financially rewards drivers who accumulate a large number of trips and informs them of</p>
--	--	---

	<p>where and when they can rely on there being a high volume of trips and/or advantageous fares (which thus enables Uber to tailor its supply to fluctuations in demand without exerting any formal constraints over drivers); (iii) exerts control, albeit indirect, over the quality of drivers' work, which may even result in the exclusion of drivers from the platform; and (iv) effectively determines the price of the service. All those features mean that Uber cannot be regarded as a mere intermediary between drivers and passengers. In addition, in the context of the composite service offered by the Uber platform, it is undoubtedly transport (namely the service not provided by electronic means) which is the main supply and which gives the service meaning in economic terms.</p>
--	--

Tab. 4.5: Juridical controversies about Uber in Europe.
Our elaboration from different sources²⁸⁹

As a result of the huge number of demonstrations and strikes held by traditional taxi companies across Europe - largely sparked by the fact that Uber's operators are exempt from bearing their same regulatory burdens - low-cost UberPOP service, relying on non-qualified drivers, has been declared illegal and thus suspended in most European countries (where only Uber's versions offered by fully-licensed professional drivers can now operate), while it is still running in Norway, Finland, Estonia, Poland, Czech Republic, and Switzerland. It is instead completely banned in Denmark, Hungary, Bulgaria, and the cities of London and Brno²⁹⁰. As a response, Uber submitted

²⁸⁹ Court of Justice of European Union, Press Release No. 50, 11 May 2017, <https://curia.europa.eu/jcms/upload/docs/application/pdf/2017-05/cp170050en.pdf>; Jiménez Cano (2014); TaxiLeaks(2014); Scott (2015); Auchard & Steitz (2015); The Guardian (2015); The Guardian (2016); The Guardian (2017a, b, c); Barainsky, Gumberidze & Nurul (2016); Van de Poel (2016); Chapman (2017); Lamas (2017); McGoogan (2017).

²⁹⁰ See: *Uber operates in more than 90 European cities, despite legal battles*, Reuters, 22/09/17, <https://www.reuters.com/article/us-uber-britain-europe-factbox/factbox-uber-operates-in-more-than-90-european-cities-despite-legal-battles-idUSKCN1BX1WX> ; Rhodes A., *Uber: Which countries have banned the controversial*

complaints to the European Commission against Spanish, German and French national court bans²⁹¹ for violation of Art. 49 (right of establishment) and Art. 56 (freedom to provide services) of the Treaty on the Functioning of the EU. On July 4th 2017, reaffirming his recent opinion on the case described in the table above concerning Uber Spain, the ECJ Advocate General Maciej Szpunar stated that any Member State can legally ban the UberPop service from their territory without having to notify the Commission²⁹².

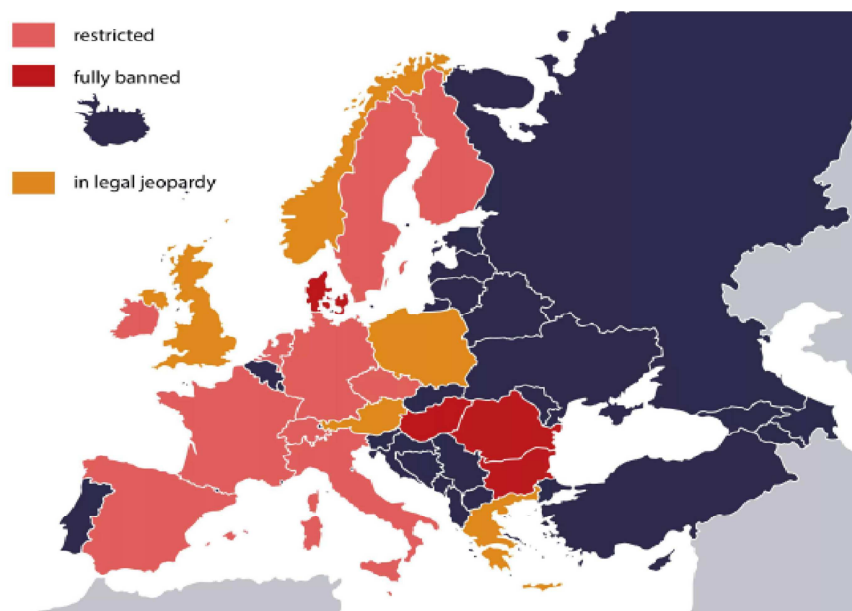


Fig. 4.12: Where Uber is totally banned, restricted or in legal jeopardy in European Countries

SOURCE: Noack (2017), The Washington Post.

Uber has also run into not negligible privacy concerns. In 2014, *Buzzfeed* revealed (Bhuiyan & Warzel, 2014) the existence of a widely available internal company tool called “GodView”, with which all corporate employees could access customers’ name, real-time (and historic) location data, and Uber trip logs. Uber’s program was used to track high profile politicians, celebrities, and even personal acquaintances of Uber employees, according to a court declaration²⁹³ given by the company’s former forensic investigator Samuel Ward Spangenberg in October 2016. The plaintiff also reported that: «Uber lacked security regarding its storage of driver information, including social security numbers» and collected data regarding ‘every ride a user requested, their username, the location the ride was requested from, the amount they paid, the device

taxi app, The Independent, 22/09/17, <http://www.independent.co.uk/travel/news-and-advice/uber-ban-countries-where-world-taxi-app-europe-taxi-us-states-china-asia-legal-a7707436.html> ; Kollwe J. and Topham G., *Uber apologises after London ban and admits 'we got things wrong'*, 25/09/17, <https://www.theguardian.com/business/2017/sep/25/uber-tfl-concerns-vows-keep-operating-london-licence>

²⁹¹ Fairless T., *Uber Files Complaints Against European Governments Over Bans*, The Wall Street Journal, 01/04/15, <https://www.wsj.com/articles/uber-files-complaints-against-european-governments-over-bans-1427885946>

²⁹² *EU Court’s top lawyer says member states have right to ban Uber*, EURACTIV, 04/07/17, <https://www.euractiv.com/section/future-of-mobility/news/eu-courts-top-layer-says-member-states-have-right-to-ban-uber/>

²⁹³ <https://www.documentcloud.org/documents/3227535-Spangenberg-Declaration.html>

used to request the ride (...), the name and email of the customer, and a myriad of other data that the user may or may not know they were even providing to Uber by requesting a ride». Similar allegations had been made by the public interest research centre EPIC, which submitted a compliance²⁹⁴ in mid-June 2015 to the Federal Trade Commission, requesting an investigation in reaction to Uber's announcement (Tassi, 2015) of changes to its app's privacy policy, an update that was made operational one month later. EPIC pointed out that, under the new privacy regime, Uber will be able to collect location data of the user not only when the app is running in the foreground, but also when it is operating in the background, and even after the app has been terminated by the user. Even if the GPS is disabled, the company may still derive approximate location from riders' IP addresses. Uber was therefore accused of deceptive representation that "users will be in control" of their privacy settings and that users' data would be protected by robust security measures (while Uber's database had already been successfully hacked in 2014²⁹⁵). In August 2017 Uber announced to remove the controversial post-trip tracking feature from the app (Gibbs, 2017) and also agreed to pay \$20 million to settle FTC charges²⁹⁶ that the ride-hailing company misled its users by misrepresenting the extent to which it monitored its employees' access to customers' and drivers' personal information and by failing to reasonably secure consumers' sensitive information stored in its databases. Uber has been therefore required «implement a comprehensive privacy program that addresses privacy risks related to new and existing products and services and protects the privacy and confidentiality of personal information collected by the company», and to 'obtain within 180 days, and every two years after that for the next 20 years, independent, third-party audits certifying that it has a privacy program in place that meets or exceeds the requirements of the FTC order»²⁹⁷.

Only some month after this settlement, Uber's current chief executive officer Dara Khosrowshahi revealed (Khosrowshahi, 2016) that the company has covered up for one year a massive data breach that occurred in October 2016. The cyber-attack involved the personal information of 57 million Uber users around the world, including namely names, email addresses and phone numbers, and also 600,000 U.S. driver's license numbers. The two hackers have been paid \$100,000 (Newcomer, 2017) to delete the information that had been stolen and to keep the breach secret. «We are changing the way we do business, putting integrity at the core of every decision we make and working hard to earn the trust of our customers»²⁹⁸, Dara Khosrowshahi stated, after declaring the absence of evidence of fraud or misuse tied to the incident.

In spring 2017, *The Information* revealed (Efrati, 2017) that Uber allegedly run, between 2014 and the early part of 2016, a secret software program internally called "Hell", firstly used to create fake Lyft rider accounts and to trick the system of its main competitor by making it believe those riders were in certain locations. This allowed Uber to see the eight closest available Lyft drivers to each fake rider. Then Uber executives discovered

²⁹⁴ Federal Trade Commission, 22 June 2015, <https://epic.org/privacy/internet/ftc/uber/Complaint.pdf>

²⁹⁵ Occurred in May 2014, the breach wasn't discovered until September and the notification went out in February 2015. The intruder was able to access one file containing sensitive personal information belonging to 100,000 Uber drivers. In May and July of 2016, Uber learned that 60,000 additional unencrypted names and driver's license numbers had been leaked. See: Fox-Brewster (2017)

²⁹⁶ See https://www.ftc.gov/system/files/documents/cases/1523054_uber_technologies_complaint.pdf

²⁹⁷ See:

<https://www.ftc.gov/news-events/press-releases/2017/08/uber-settles-ftc-allegations-it-made-deceptive-privacy-data>

²⁹⁸ See: https://www.ftc.gov/system/files/documents/cases/1523054_uber_technologies_complaint.pdf.

that Lyft had assigned a numerical user ID to each of its drivers, and started to track them in order to deduce which drivers were working for both companies. By artificially ensuring that double-shifting drivers were allocated more Uber rides, the company supposedly attempted to limit the driver availability for its competitor. A US District Court judge in California dismissed (Korosec, 2017) in August 2017 a class action lawsuit filed in April against the company by a former Lyft driver, claiming that Uber had violated privacy, competition, and communications laws. The court granted Uber's motion to dismiss the lawsuit with "leave to amend", arguing that Lyft drivers agree to "give up" their location information when using the app, that the complainant did not provide sufficient evidence over the alleged "interception" of his communications, and failed to demonstrate the occurrence of any "loss of money or property" to justify his appeal to the Unfair Competition law. Nevertheless, in early September the FBI's New York office and the Manhattan U.S. attorney's office opened an investigation (O'Brien & Bensinger, 2017) to probe whether the "Hell" software constituted a legal interference with its rival Lyft.

Finally, Uber has been using since 2014 a secretive software tool named called "Greyball" (Isaac, 2017) to identify and circumvent authorities worldwide, particularly in those markets where the service was outright banned or resisted by law enforcement. According to the *New York Times report* – based on interviews given by four current and former Uber employees -, the tool was part of a wider program called VTOS ("Violation of Terms Of Service"), conceived to deny service to individuals suspected to be potentially dangerous for Uber drivers or willing to disrupt Uber's operations. To deceive public authorities, Uber uses different techniques. Among these, there is the practice of "geofencing" the locations of city government offices and then flagging an individual hailing a ride from that area as a "greyball", namely a potential law enforcement agent. Other methods include mining users' credit card information to determine whether the card is associated with a government agency or police union, or relying on Uber employees to search social media profiles and other publicly available information. United States Department of Justice has opened a criminal investigation (Dwoskin & Timberg, 2017) into Uber's use of "Greyball" tool and a member of the European Parliament for the Dutch Democratic Party also asked²⁹⁹ the European Commission for an investigation on 13th March 2017. An answer³⁰⁰ was given in July by European Commissioner for Digital Single Market and Vice President of the European Commission Andrus Ansip, stating that *'the Commission does not have information related to the data-gathering tool known as "Greyball" beyond what press reports have written. The Commission cannot therefore assess whether there may be any concerns under EC law nor confirm at this stage whether it is planning to launch a formal investigation into the legality of the tool. More in general, there is currently no plan to revise the guidelines on the collaborative economy adopted last year. The Commission, however, will continue to monitor developments related to the collaborative economy, as announced in its communication on the Collaborative economy of June 2016'*.

²⁹⁹ *Question for written answer to the Commission*, Rule 130, Marietje Schaake (ALDE), 29/03/17, <http://www.europarl.europa.eu/sides/getDoc.do?type=WQ&reference=E-2017-001673&language=EN>

³⁰⁰ <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=P-2017-001840&language=ES>

4.4.5 Alternative approaches

Author: Ricard Espelt

The most relevant alternatives to Uber are promoted by the own taxi drivers, which have started to organize as cooperatives³⁰¹. One of the first examples in that sense is the Union Taxi in Denver³⁰², Colorado, a driver-owned taxi cooperative.

Drivers, organized as taxi cooperatives, are better paid and have better working conditions than what traditional taxi companies and Uber can offer³⁰³. A cooperative organization allows the taxi drivers to have control of the economic activity and also to participate in the organization's governance.

In Portland, Oregon, there is a similar project called PDX Yellow Cab³⁰⁴, where Somali cab drivers promote taxi drivers under cooperative values.

In this case, the alternatives, rather than focusing on the code of the platform (open or property software), the architecture of technology (centralized or decentralized) or the management of users (with less or more profile control), focuses on the labor rights of people which are part of the organization, which in the case of Uber are unprotected. On the other hand, the common characteristic of these alternatives is the way they focus on local communities more than as a global service.

³⁰¹ For a detailed discussion about alternative digital platforms based on cooperativism values in Barcelona case, see: Fuster Morell M., Carballa Smichowski B., Smorto G., Espelt G., Imperatore P., Rebo M., Rocas M., Rodríguez N., Senabre E., Ciurcina M. (2017), pp. 84-110, D2.1 of DECODE project. <https://desk.dyne.org/s/19IMbexVEDzHEks#pdfviewer> .

³⁰² <http://www.uniontaxidenver.net>

³⁰³ <https://www.shareable.net/blog/11-platform-cooperatives-creating-a-real-sharing-economy>

³⁰⁴ <http://www.pdxyellowcab.com>

4.5 On-demand platforms (bis): the case of Airbnb

Author: Elena Musolino

4.5.1 General Description

Airbnb it's an online marketplace around hospitality service. The company does not own of rental solutions, it takes a percentage from both Hosts and Guests on each booking. Platform works online, it also works by mobile system, account creation and use of website is free. In addition to lease or rent lodging, Hosts can also offer "experiences" namely are excursions or other activities designed and led and available for various skill levels and interests – of which Airbnb takes a percentage as a commission as well.

The company began in 2007, in conjunction with a big *Conference on Design* in San Francisco, when roommates Brian Chesky and Joe Gebbia started AirBed & Breakfast on the living room's floor of their apartment with three air mattresses and homemade breakfast to guests who were unable to find alternative and low cost accommodation in the city. Sniffing out a good opportunity of business Chesky and Gebbia involved Nathan Blecharczyk to create a bigger site to include more people to opening the supply of sharing spaces, previously in coincidence with big events into the city. They were creating a new low cost instrument for travellers of the world and by 2009 the *Airbnb.com* was officially launched on the web, including in the supply full flats. During the following years the platform sign a significant transformation for the global tourist's sector, it extraordinarily had expanded and provided millions of accommodation into the world.

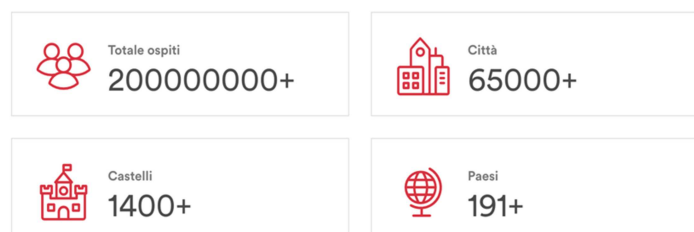


Fig 4.13: About Airbnb. Source: <https://www.airbnb.it/about/about-us> (October, 2017)

Airbnb, founded in 2008, has its registered office in San Francisco, California. In 2011, the company started its overseas expansion, opening its first international office in Hamburg, Germany. It is defined: «a trusted community marketplace for people to list, discover, and book unique accommodations around the world — online or from a mobile phone or tablet.»³⁰⁵ The accommodations that make up the Airbnb's universe are extremely heterogeneous, it's possible to divide a sofa into a living room or book an entire island (Wortham, 2011); however, the most common use concerns private rooms or entire apartments. On the platform are allowed, in addition to Bed & breakfast owners, property owners/renters who are allowed to make available their own sharing space - or in their absence – for short and long periods. The website has a constantly changing graphic style, follows trend and social media fashion, changing its appeal appealingly. On the Guest side to the main function "homes" – accommodation

³⁰⁵ <https://www.airbnb.it/about/about-us>

reservation nowadays – there are two new offers: "experiences" and "restaurants". Searches can be made by selecting different filter options.

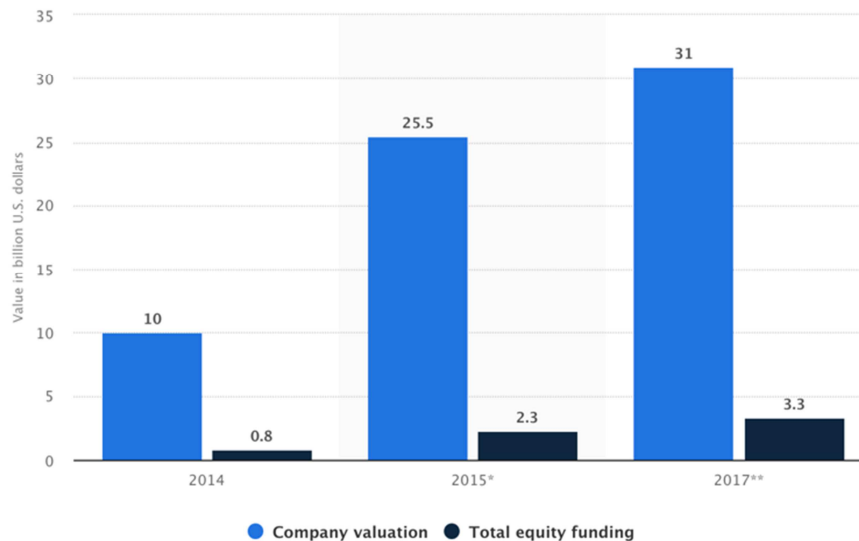


Fig. 4.14: Company Value and Equity Funding of AirBnB from 2014 to 2017 (billion US\$.)
Source: <https://www.statista.com/statistics/339845/company-value-and-equity-funding-of-airbnb/> .

The trend observed in these nine years of activity suggest the actual growth of the platform: presently it has more than three million ads as shown in Fig. 1. Through July 2011 to march 2017, the company had carried out a large amount of investments in venture funding from different companies bringing their total funding raised to date to more than US \$ 3 billion³⁰⁶. To get a look to the numbers, as can be seen in Fig. 4.14, statistic shows the company value and equity funding of Airbnb from 2014 to 2017. Online home-sharing company Airbnb was valued at U.S. dollars 31 billion as of May 2017, with total equity funding of around US \$3.3 billion. In academic literature is growing the interest of studies of the emergent phenomenon of so-called *sharing economy* and collaborative economy as well.

Airbnb as a case study is opening an increasing number of new question of research: its business model and disruptive effects, customer behaviour and trust, legal issues, laws enforcement and taxation, impact of city destinations.

Legal issues are the most surveyed; an example is the work of Quattrone, Proserpio, Quercia, Capra & Musolesi (2016) focus on regulation of Airbnb. Starting from London's case study, they suggest possible innovative policies based on an analysis of spatial and economic patterns of accommodation supply and demand. From a legal and statistical study, Dayne Lee (2016) explores how short letting influences the supply of housing rental of Los Angeles and, at the same time, what municipalities can do to

³⁰⁶ <https://www.cnbc.com/2017/03/09/airbnb-closes-1-billion-round-31-billion-valuation-profitable.html> (nov. 2017)

regulate the issue. As will be seen better, Daniel Guttentag (2013) through the disruptive innovation theory observes the current tax flow and possible solutions. Brittany McNamara (2015) analyses the marketplace and the perception of Airbnb by community to concentrate her attention on regulatory aspects and advances some suggestion to regulate the platform.

Edelman & Luca (2014) propose a different perspective of analysis, they affront the topic of racial discrimination among Hosts. They demonstrated a form of racial discrimination in online marketplaces by a survey on New York city's Hosts with the corresponding prices and user feedbacks.

In the context of tourist futures Zervas, Proserpio & Byers (2014) explore the renting between properties listed on Airbnb with Hotels listed on *Tripadvisor*. Another study on Hospitality is mated from Ikkala & Lampinen, the authors found out that Hosts are motivated to monetize hospitality both for economic and social interaction advantages. They design a critical reflection on the evolution of sharing economy, its shift from the mutual benefits to commercial intention. In the same way the paper of Oskam & Boswijk (2016) – as will be seen better – demonstrates how network platform as Airbnb are often classified under *sharing economy* label, but in fact the evolution of the networked hospitality business turned the concept into a for-profit model.

The work of Yannopoulus, Moufahim & Bian (2013) notices brand identity construction of user-generated brands through a visual analysis. The authors underlined the peculiarities of identity contractions and visual representation into the universe of Airbnb and *Couchsurfing*. In this frame it's possible to collocate the study of Celata, Hendrickson & Sanna (2017), it offers a comparative analysis of the main sharing platform in the field of accommodation, focused on relationship between trust, reciprocity and belonging.

Finally, Airbnb is attracting the interest of urban planning and geographical studies, Gurrán & Phibbs (2017) examined the effects of Airbnb and the implication for the local housing markets in Australian cities. Picascia, Romano & Teobaldi (2017), recently introduced into the debate the term of *Airification* of cities – as will be shown below. According with their study on historical Italian urban centres, the authors demonstrate how Airbnb contributes to transform the historic centres into *cathedrals of consumption*.

4.5.2 Airbnb's business model

According to the purpose of *Deliverable* could be reasonable at this time focalize the analysis on Airbnb's business model. In the scenario of sharing economy, Airbnb is known into literature as *networked hospitality business* (Oskam & Boswijk, 2016), a new phenomenon with a very rapid growth during last ten years. In fact, this experience is outperforming the major hotel chains in order of space offered and market valuation. This kind of business model was declared – by Guttentag (2013) first and from other successive studies– as *disruptive innovation*³⁰⁷ in terms of consequently effects of transformation of market and consumer behaviours.

In order to understand how the lens of *disruptive innovation* theory is helpful to drop the line about the Airbnb's potential of negative impact on traditional accommodation sector, it's useful to introduce a definition rewritten by Daniel Guttentag:

³⁰⁷ Disruptive innovation theory was proposed and popularised by Clayton Christensen in several seminal works: Bower & Christensen (1995); Christensen (1997); Christensen & Raynor (2003).

This theory outlines a process through which a disruptive product transforms a market, sometimes to the point of upending previously dominant companies. A disruptive product will generally underperform with regards to the prevailing products' key performance attribute(s), but will offer a distinct set of benefits, typically focused around being cheaper, more convenient, or simpler. Consequently, the disruptive product appeals to the low-end of the market or creates a completely new market. This initial market is limited in size and profit margins, so it is unappealing to leading companies that are content to focus on their more profitable markets and continue marginally improving their products through 'sustaining innovations'. Nonetheless, over time the disruptive product improves, thereby making it appealing to greater numbers of customers and attracting increasing levels of the mainstream market. This shift may eventually attract attention from the leading companies, but by then the disruptive product may be so entrenched that the previously leading companies struggle to compete. In other words, disruptive innovation theory describes how companies may falter not by falling behind the pace of advancement or ignoring their core consumers, but rather by disregarding the upward encroachment of a disruptive product that lacks in traditionally favoured attributes but offers alternative benefits. (Guttentag, 2013, p.1194)

What's new in Airbnb's universe? It created a new marketplace in a peer to peer sphere. The framework of Airbnb is the collaborative economy that involves individuals renting access to their underused assets but, unlike traditional B&B, its incorporated new web 2.0 technologies «which allow users to generate the content published on websites (e.g. Facebook users creating their own dynamic pages)» (Guttentag, 2013, p. 1195). Host can promote their accommodation to potential guests posting descriptions and photographs, communicating by platform, taking reservations and payments. Moreover, another milestone of Airbnb is the *reputation mechanism* (Lauterbach, Truong, Shah & Adamic, 2009), that is its instrument of review feature, where guests and *hosts* post public reviews about one other. This mechanism is also used in the traditional system that has been access to the Internet – for example booking.com– but, in the case of Airbnb, reviews are linked with the profiles of users (host and guest) and creating an incentive for both parties to conduct themselves in an acceptable manner.

Airbnb structured its appeal to tourist starting from: the use of web technologies, lower cost of accommodation, the benefits from residential ambient – home's comfort, amenities such as a full kitchen, washing machine, bigger fridge, etc.– the possibility to get the chance to have a more *home-grown* experience by living like a local interacting with the host and neighbours. A summary of these features which brings us back to disruptive product that largely underperform the prevailing products' key attributes, but disruptive products are also often cheaper and offer new benefits (Guttentag, 2013).

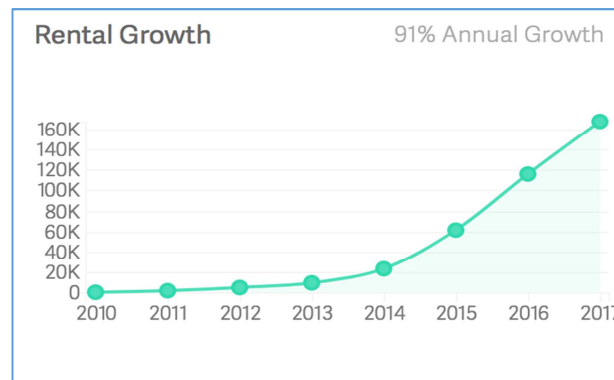


Fig. 4.15: Rental growth, London Market Overview. Source: AIRDN

In this frame, Airbnb’s experience is growing over past few years; numbers, as mentioned previously, are enormous and rental growth market is linearly expanding. As can be seen in the Fig. 4.15, that describes rental growth trend in London – to name a case in point– from 2010 to 2017. Developing analysis to transformation of phenomenon, it’s clear that today *Hosts* are not only longer owners of single home (or room), market attracted investors that have become *multi-listing host* into the Airbnb’s scenario. From three air mattress on the floor to Manhattan loft for 1000 \$ a night, or luxury flat in Paris and stilts on the sea in Thailand, company crossed the line has become among the largest competitor – and disruptor both– into the traditional hospitality industry. In an economy dematerializes, the process of fast digitization is disrupting previous market models and is opening new business perspective towards knowledge platform and value networks.

The *Networked hospitality business* has its specific operating principles because of the different types. Oskam & Boswijk (2016) postulated a scheme about different forms of digitized value platforms divided into two dimensions and four different derived types (Kostakis & Bauwens, 2014; Bauwens, 2014) of value networks: the first one – horizontal– is the commons vs private/commercial; the second one is open system vs controlled and closed system (Fig. 4.16).

1. In the upper left quadrant we identify open and not for profit systems. Like Wikipedia, Linux. Here one speaks of co-created P2P value. The public benefit is central. There is no other reward than the intrinsic value.
2. On the upper right quadrant we identify P2P social marketplaces based on open systems and with a fine tuned distributed market function.
3. On the left bottom we identify collectives that are characterized through a closed protected system and for the common good. We call these collectives; an example is the Mondragón collective in the Basque Country (Kasmir, 1996).
4. On the bottom right, we identify the network capitalists, they are based on *hyperconnected* and distributed platforms with a commercial goal (Oskam & Boswijk, 2016, p. 24-25).

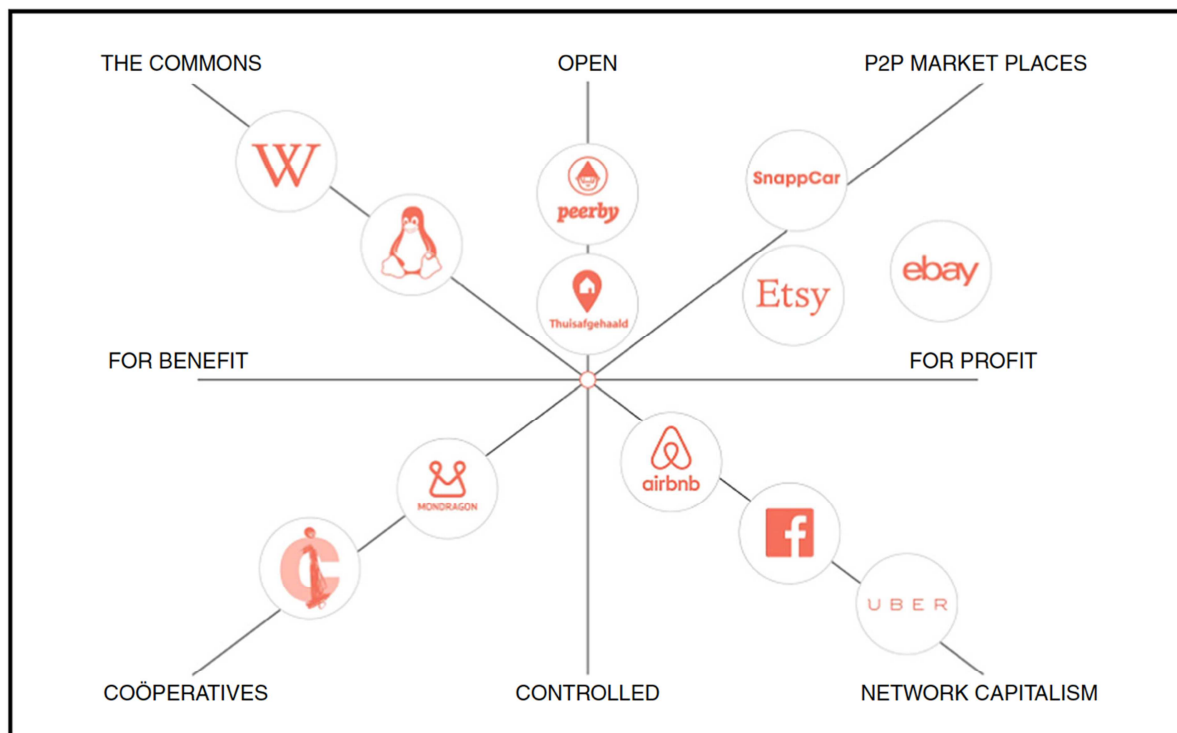


Fig. 4.16: Types of value networks. Source: Oskam & Boswijk (2016, p.25)

At this point the authors present an interesting clarification about “sharing” concept: they emphasize the semantic shift that is going on to define a marketplace that connect supply and demand between companies and customers on a digital platform, very far from what is traditionally called “sharing” – that not involve the exchange of money by definition. On the other hand, they observe how companies stand for a digitally enabled expansion of the market economy to grab new space of valorisation, and Airbnb is a paradigmatic case.

With reference to the above, it’s possible to confirm that networked hospitality business was emerging such a driven by economic benefits; disruptive innovations have triggered the offer of tourist accommodation and to visitors’ experience. This innovation will be implemented by network platform where users shared underutilized goods but, at the same time, they did it for economic transaction. As will be seen in the next paragraph, Airbnb could be defined like an example of a for-profit peer to peer network platform.

4.5.3 Value creation model: a simplified framework

The rationale and main lines of Airbnb’s users (Host and Guest) are ordered from financial motivation: on one side Hosts, compared to traditionally hotels, offer competitive rates because they rent out private home with housekeeping already covered and because of minimal labour costs – Airbnb’s activities usually are an additional income– finally, because stays are ordinarily not taxed; to the other side, for Guests Airbnb is principally a low cost option.

Value creation model is based on commissions paid by guest and Hosts as follows:

«Host service fees:

We charge hosts a service fee (including taxes, if applicable) every time a booking is completed. The amount of the host service fee is generally **3%**, but may range between 3-5% depending on the cancellation policy selected by the Host. The host service fee is calculated from the booking subtotal (before fees and taxes) and is automatically deducted from the payout to the Host.

Guest service fees:

When a reservation is confirmed, we charge guests a service fee between **5%** and **15%** of the reservation subtotal. Guests see this fee on the checkout page before they book a reservation. In areas where we're required to collect VAT, we'll combine the service fee and VAT amounts on the checkout page, so the service fee may appear to be greater than 15%. Guest service fees are calculated using a variety of factors including, but not limited to, the reservation subtotal, the length of the reservation, and characteristics of the listing. In general, higher reservation subtotals have lower guest service fee percentages.»

308

Airbnb's business model could be defined as a two-sided market:

«P2P accommodation can therefore be seen as a two-sided market in which the platform facilitates transactions and adds value to both sides by bringing both buyers and sellers "on board" (Rochet and Tirole, 2004). The price composition favours or "subsidizes" the host side in the case of Airbnb, as part of the company's growth strategy: sellers are incentivized to join the network, thus maximizing its attractiveness to accommodation seekers. Unlike in more traditional business models, in the case of two-sided platforms growth leads to increasing returns to scale, as users will pay more for access to a bigger network (Eisenmann et al., 2006, p. 92). It is therefore not surprising that the platform, as it keeps adding listings to its offer.» (Oskam & Boswijk, 2016, p. 27)

Trust is what makes it work shows on the top the Airbnb's web site. Company created conditions to guarantee a virtual safe ambient that produces trust and security, to Hosts and Guest as well. Paradoxically Airbnb did it eliminating possibility of direct relationship – by an algorithm that block every passage of telephone number, e-mail address and alternative method of payment from platform instrument. Trust becomes central factor of the business model, each Host and Guest owns specific *reputation capital*.

To better understand the Airbnb's mechanism of value creation model observing the scheme below can be stated:

Host side: Hosts are the people who own property, or event, and want to make money by renting out their available space/experience. They can generate a listing for their property on Airbnb, add property features and set their own rent. Hosts can accept or reject a booking after reading the reviews of the guests or after going through their social profiles.

Airbnb has two types of hosts:

Rental hosts offer houses, units/condos, rooms, and more exotic stays, such

³⁰⁸ See <https://www.airbnb.com/help/article/1857/what-are-airbnb-service-fees>.

as castles, igloos and more; **Event hosts** offer to guide through local experiences, food, art, fashion, nightlife)

Host creates a listing on Airbnb with a description of his space, how many guests he can accommodate, and adds photos and details³⁰⁹. Airbnb's pricing tool can recommend competitive rates, but the final price is decided by the host.

By the platform Host can know Guest before arrival by messaging them. Finally, Airbnb's secure payment system means Host never have to deal with money directly. Guests are charged before arrival, and Host is paid automatically after check in, minus a 3% service fee. Host can be paid via PayPal, direct deposit, or international money wire, among other ways.

In the event of accidental damage, the property of every Airbnb host is covered up to a million dollars. It's peace of mind at no extra charge; at the same time If guests get hurt or cause property damage, Host Protection Insurance protects you from liability claims up to a million dollars, included free for every Airbnb host.

All Airbnb travellers must submit a profile photo and verify their phone & email. Hosts can also require a government ID. Guests and hosts each publish reviews after check out keeping everyone accountable and respectful.

The host service fee is generally **3%** calculated from the booking subtotal.

Guest side: Guests are the people who book the listed available accommodations from local hosts. Guests have the option to search for a property by filtering them according to rent, amenities provided, location etc. Travellers can book a space by paying through the Airbnb portal.

Guest can search a place to stay on the platform entering destination, travel dates, and number of guests. When guest is ready to book a place on Airbnb, he can send a request to the host to book a reservation. If he is unsure about the listing or its availability, he can send a message to the host.

On the guest side the service fee is between **5%** and **15%** of the reservation subtotal.

In relation with *claim on trust* of community, before booking or listing a home or experience, all guests and hosts must provide a profile photo and confirm their phone number. Platform may also ask for a government ID. As explained below, this helps us keep Airbnb secure, fight fraud, and more.

Rating: The host and the traveller can rate each other and can write reviews based on the experience. These are different types of reviews people can leave for selected products:

³⁰⁹ Airbnb has a vast network of freelance photographers in all major cities of the world who go to a location and click high-definition photographs of the property. The high quality photographs get more responses and the freelance photographers are paid by Airbnb directly.

Public reviews: Up to 500 words that are visible to everyone in the community;
 Private feedback: A message to a host or guest to show appreciation or suggest improvements;
 Star ratings: Ratings for hosts from 1 (worst) to 5 (best) for the overall experience and for specific categories;
 Group reviews: A public review that appears on the profiles of all of the guests on the reservation.

Airbnb finds customer by different combination of source to accumulate hosts and travellers, the major include:

1. Social Media
2. Word of Mouth
3. Digital marketing – including internet advertising
4. Promotional offers
5. Affiliate Model/ Refer and earn offers

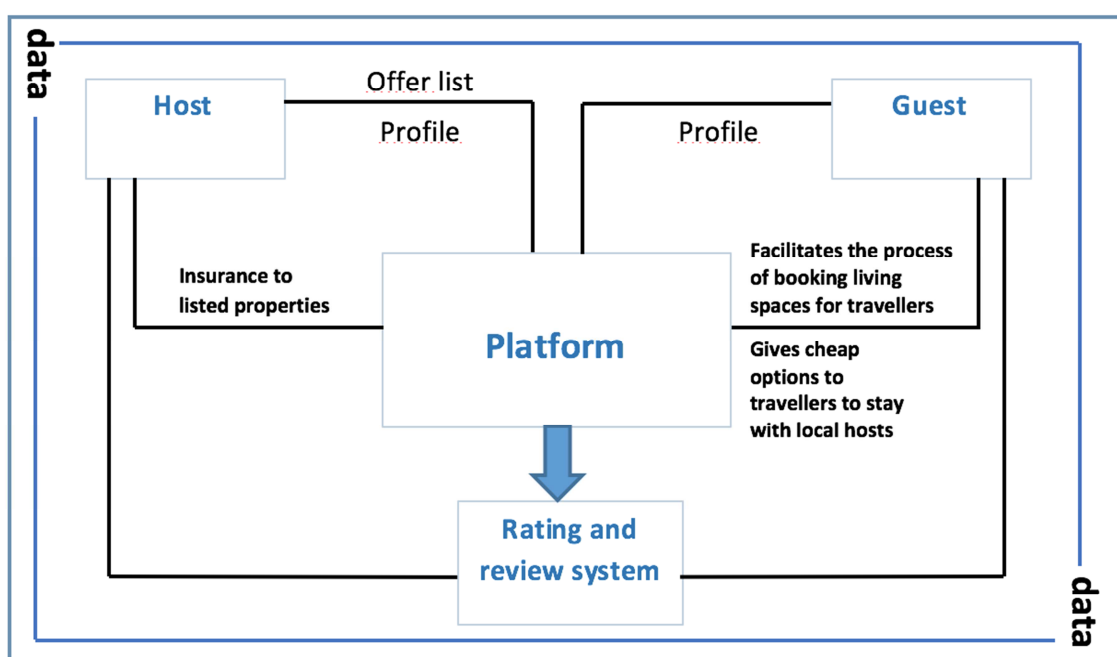


Fig. 4.17: Value Creation Model of Airbnb

At the same time It shall be possible to observe the Value creation model by the business model Canvas³¹⁰ perspective (Fig. 4.18); it is a helpful instrument to explains the key partners, key activities, key resources, value propositions, customer relations, channels and customer segments of Airbnb. Along with this, the cost structure and revenue streams of Airbnb have also been listed.

Likewise, with Canvas model, results the core of the process of value creation: on the one side because the network, the channels that permits to connects key partners

³¹⁰ A template model initially processed by Alexander Osterwalder, see Osterwalder & Pigneur (2010). B

(Host, Guest, Photographers, investors and payment processors) activities and resources and customer segments; to the other side the trust issue into the platform relationships.



Fig. 4.18: Business Model Canvas of Airbnb.

SOURCE: <http://nextjuggernaut.com/blog/airbnb-business-model-canvas-how-airbnb-works-revenue-insights/#lightbox/1/>

4.5.4 Risks connected to the current value creation model

Airbnb's growth is crossed by different emerging risks, in relation to the above, can be useful underlines at least three different issues:

1. The impact and effects on the traditional tourism accommodation sector;
2. The consequentially legal issues surrounding Airbnb
3. The impact of peer to peer short term rental on urban functions and economy

According to the Bank of America Merrill Lynch, as of 2017 oversupply will negatively affect traditional hotel business values (Huston, 2015). For a paradigmatic example, the impact of Airbnb on hotel revenues has been quantified in a study by Zervas et al.(2014)in a Texanian case study:

The authors estimate a 13 per cent loss of room revenue for Austin and a 0.35 per cent decrease in monthly hotel room revenue for every 10 per cent increase in Airbnb listings for Texas in general. The same authors observe that lower-end hotels and hotels without business facilities suffer most. A study on the effect of Uber on taxis in New York and Chicago shows, in a similar fashion, a reduction of complaints as the alternative offer grows, which can be interpreted as a clean-up of the system: taxis are forced to improve quality or they are driven out of business. (Oskam & Boswijk, 2016, p. 28)

Therefore, Airbnb's numbers are already quite substantial, it could mean that in one side the phenomenon is negative for traditionally accommodation market but, to the other side, is something good for tout court tourism.

At the moment, estimate the general economic impact of Airbnb's presence on the market does not simple, there are not independent studies, it is possible to read the data provided by Airbnb and, at the same time, they are not completely homogenous for the different destinations. Generally, the impact is non-uniform, could be possible affirm that cities receive benefit by increasing the number of visitors, by spreading them over the cities and by financially empowering non-traditionally employed residents.

Therefore, if on one side Airbnb is cannibalizing guest from the traditional accommodation market, to the other side increasing the room supply – by P2P travel model that should foster and attract new category of traveller– should have positive impacts on the broader tourism economy (Guttentag, 2013)³¹¹.

The reaction to the growth of Airbnb end its impact on the economy field by authorities and the marketing response is based on regulation debate. The regulation is being approached from three different angles:

Its most visible manifestation affects the authorities themselves: this is about if and how tourist and other taxes should be imposed on Airbnb (Maxfield, 2015; Kaplan and Nadler, 2015; Vincent, 2015; Posthumus, 2015). Directly related to this subject is the protest against unfair competition on behalf of the industry (EY España, 2015; Kagermeier et al., 2015). To protect residents, housing regulations limiting rental days apply in cities as New York and Amsterdam (Coldwell, 2014; Dickey, 2014; Tienkamp, 2015; Vekshin, 2015), or prohibiting unregistered accommodation altogether in Barcelona (Cogolludo, 2015; Soriano, 2015). Housing stock and rental fees are the focus of the German debate around Zweckentfremdung or "usage alienation", although several studies relativize the actual vs the perceived effects of holiday rentals (Ziegert, 2013; Fuller and Michel, 2014; Blickhan et al., 2014; Kagermeier et al., 2015). The protection of the hosts' interests and liabilities vis-à-vis Airbnb has been analysed by McNamara (2015). Finally, there are consumer protection issues (Nicholls, 2015). It remains to be seen, however, whether new laws and regulations can be effectively enforced: in San Francisco, out of 5,000 Airbnb hosts only 455 registered with the city's Planning Department (Marzorati, 2015). (Oskam & Boswijk, 2016, p. 30)

Airbnb is responding to these claims, it's addressing to their Hosts specific policies, it's starting with an active marketing and lobbying policy to underline the advantage of the platform in the field of economic impact, the spreading tourism to peripheral areas and generating additional income for non-traditionally employed residents.

Finally, emerge the big question of gentrification linked to Airbnb's issue³¹². As is been

³¹¹ for example, because attract people to neighbourhoods that do not receive much tourist expenditure.

³¹² «Other platforms such as Airbnb have caused controversy in some cities by contributing to upwards pressure on rental prices and making it difficult to implement fairer regulation by concealing information about rule-breaking Airbnb hosts from local government.104 Other controversial features include Airbnb's 'instant booking' process which removes the ability of hosts to vet prospective guests. Hosts do not have to use this function, but the platform strongly encourages them to do so. This is a benefit for the platform because it increases the number of bookings and therefore revenue, but it is not necessarily good for hosts.» Symons & Bass (2017), D1.7 of DECODE project, p. 67

before, in academic field, but not only, there is a vast debate on the impact of peer to peer short term rental on urban functions and economy. According to paradigmatic Italian example developed in the work of Picascia, Romano and Teobaldi (2017, p. 5), the supply of Airbnb accommodation is concentrated around historical cores:

- This trend seems to be reinforcing over the years, as more entire properties have been listed in 2016 than 2015: the proportion of entire homes over the total number of listings increases in all cities.
- Within historical cores the trend is even more pronounced: the proportion of entire homes over the total number of listings is higher in the centres than elsewhere in all the cities considered. This proportion increased further between 2015 and 2016.
- The proportion of entire places listed in historical cores vs. the total number of entire places is decreasing in many cities. This signals that the Airbnb habit is spreading to areas of towns and cities other than historic centres.
- The proportion of the housing stock devoted to STR in historic centres is increasing and, in some places, has reached levels unseen in the world: 18% in Florence, 25% in Matera, 8% in the vast historical core of Rome.

The survey suggests, first of all, that Airbnb is affecting prices of both rent and purchases, mainly in the centre of large cities where tourists visit – especially where prices are too high for ordinary people to afford, Airbnb can be a gentrification tool. Looking to another exemplary case: London (Fig. 4.20).

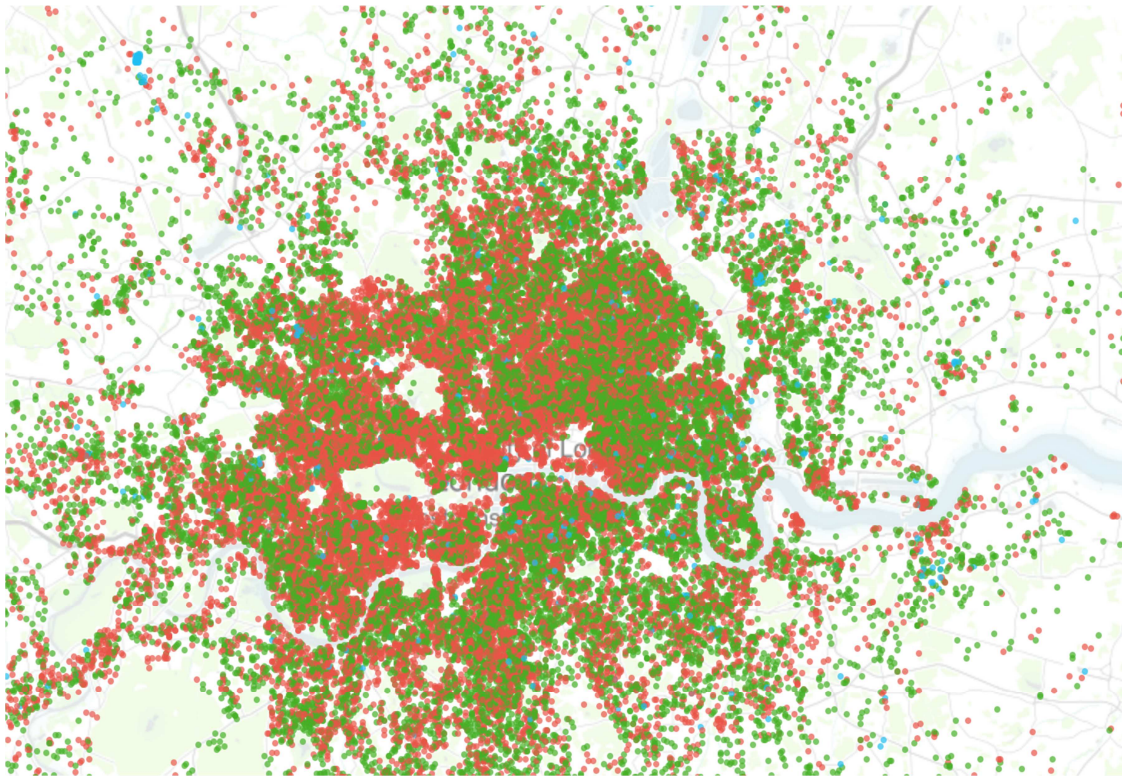


Fig. 4.20: Airbnb in London. SOURCE: <http://insideairbnb.com/london/#>

The map is developed from *InsideAirbnb*³¹³, a site that publishes data about the home rental app, and shows the Airbnb affecting on the cities' neighbourhoods; green dots represent the private room homes available on Airbnb today, red dots are the entire homes and the blue ones are the shared rooms. It's a perspective of strong impact, it appears as if London consists almost entirely of Airbnb rentals, in fact, there are 49,348 Airbnb listings out of a total housing stock of about 3.5 million units. However, looking to distribution of short term rental into neighbourhoods, in the centre Airbnb's density is concentrated (Fig. 4.21), but further out — where most people live — Airbnb density is low (Fig. 4.22).

³¹³ Inside Airbnb is an independent, non-commercial set of tools and data that allows you to explore how Airbnb is really being used in cities around the world.

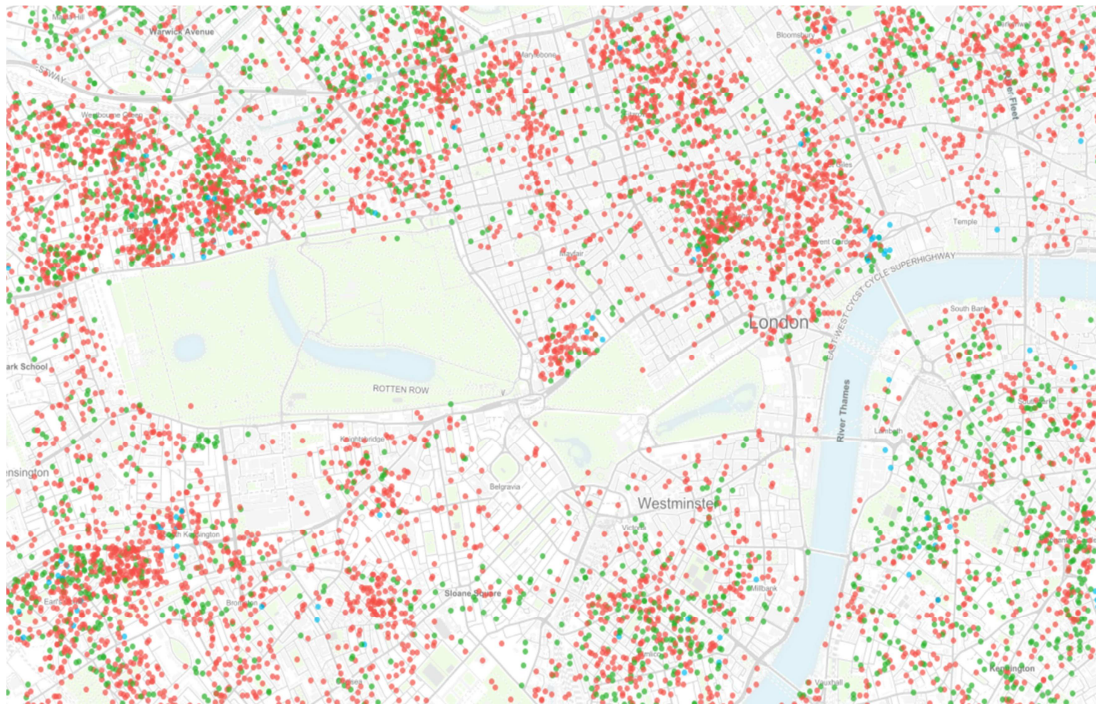


Fig. 4.21: Airbnb in London city centre.

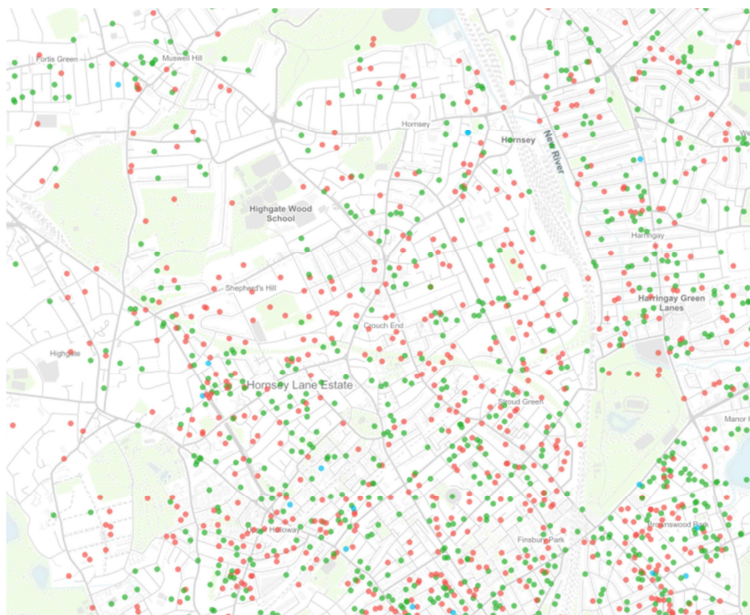


Fig. 4.22: Airbnb Highgate, Crouch End, Finsbury Park area in the north of the city of London.

According to InsideAirbnb, looking London's Airbnb listings the 41% belong to hosts who are listing more than one rental; through data it's possible to hypothesize that those properties are being rented commercially on Airbnb, not by hosts who make an extra income. Obviously and at the same time, those commercial listings remove rental units from the market that might otherwise be let to full-time residents of London. This circuit increased the process of gentrification of the cities.

It is not yet possible to affirm that Airbnb puts up the price of rents and properties, but at the current state of art data suggest Airbnb does significantly affect the vacancy rate and marginally affects prices in the most popular cities; any more than cannot to sustain that Airbnb is the principle cause of gentrification.

4.5.5 Alternative approaches

Author: Ricard Espelt

In case of AirBnb, the alternative FairBnB is still being under development by a community of activists, coders, researchers and designers who aim to address this challenge by putting the “share” back into the sharing economy. They want to offer a community-centred alternative that prioritizes people over profit and facilitates authentic, sustainable and intimate travel experiences³¹⁴.

The project has the objective to avoid the social and economical impact of AirBnB, parallel to the increase of real estate prices of flats or houses, the fragmentation of local communities and the closing of local businesses in the areas where it usually operates.

The basic principle of FairBnB is to promote collective platform ownership, where the platform is owned not by faceless investors but by those who use it and are impacted by its use: hosts, guests, local business owners, neighbours. Creating a democratic governance, based on collaboration and consensus among community members to collectively decide how the platform will be run in their neighbourhood. Furthermore, the project plans to reinvest the benefits to the community, with the objective to generate social sustainability. Thus, locals will vote to support those projects they want to see in their neighbourhoods: food coops, playgrounds, green projects, community cafes.

Finally, FairBnB, as their manifesto describes³¹⁵, is committed to open data and compliance with local and regional legislation, which will be balanced with the privacy and security needs of platform members.

³¹⁴ <https://fairbnb.coop>

³¹⁵ https://fairbnb.coop/wp-content/uploads/2017/04/FairbnbManifesto_Take2_4.4.16.pdf

Conclusion

Author: Stefano Lucarelli, Francesca Bria

Neither the four case studies representing dominant data-driven platforms (Google, Facebook, Uber and AirBnB) nor the alternative models in this report realize a democratic approach to creating and sharing economic resources. Nor do they effectively enable collective, bottom up and democratic decision-making, or ensure that people are in full control of their data and identity. In short they do not represent a real knowledge-based economy, if we intend it as a new phase of development of material, immaterial and intellectual intelligence in society. Indeed the ability to regulate the value extraction models we described in the previous paragraphs and develop alternative models represents a necessary condition for realizing the transition to a knowledge-based economy.

As we argued in sections 2 and 3 of this deliverable, both the empirical attempts to regulate data platforms and the economic theoretical debate about this kind of regulation are limited by a very narrow perspective that does not adequately consider the social, political, and economic relevance of a commons-oriented approach to data.

The value creation models of the on demand economy are typical examples of a platform capitalism that can be seen as a specific form of cognitive capitalism³¹⁶, i.e. *a new stage that follows industrial capitalism, whereby the central stake of value extraction and accumulation leads to evermore control and privatization of the collective production of knowledge and transforms it in capital of a fictitious good* (Vercellone, Monnier, Lucarelli & Griziotti, D1.3 for D-Cent project, 2014; Bria, Bianchi Dennerlein 2015³¹⁷).

The differences in the regulatory models of data platforms proposed in US and in the EU (analysed in the section 2 of this deliverable) show that the political discussion is very open, relevant, and urgent.

Three main questions seem relevant:

1. What kind of policy and regulation can legitimate people's access and ownership of data they create?
2. What kind of new collective production models can emerge as an alternative in the oligopolistic context that characterizes platform capitalism?
3. Can we regulate data driven platforms to promote a transition towards alternative approaches of collective production models where wealth is equally

³¹⁶ Cognitive capitalism and knowledge-based economy are two distinct notions that coexist and often contradict each other .

³¹⁷ <https://www.nesta.org.uk/blog/managing-knowledge-commons-interview-carlo-vercellone>

distributed, alternative property regimes over data established, and citizens' data sovereignty respected?

In order to answer these questions it is necessary a re-examination of the taxonomy here proposed about the value creation models in the platforms economy.

In particular, the next deliverable D2.4 will be devoted to considering how to establish a new hierarchical articulation between the principles of common, public and private. In the sense that the principles of the common in their radical and participatory democratic dimension can contaminate the public and the private sphere and give rise to new institutions (Vercellone, Giuliani, Brancaccio & Vattimo, 2017) able to work based on new collective agreements (e.g. data as a common good) and infrastructures to share data in a privacy-enhancing and rights-preserving way.

To do this a reflection about the possible nexus between value creation models, data commons, co-production, digital labour and data sovereignty will be necessary.

References

All the links have been visited on the 24th November 2017.

AEDP (2017), *La AEPD sanciona a Facebook por vulnerar la normativa de protección de datos*, Agencia Española de Protección de Datos, 11/09/17, http://www.agpd.es/portalwebAGPD/revista_prensa/revista_prensa/2017/notas_prensa/news/2017_09_11-ides-

Aichner T. and Jacob F. (2015), *Measuring the degree of corporate social media use*. International Journal of Market Research, 57(2): 257-275.

Allan A. (2011), *Got an iPhone or 3G iPad? Apple is recording your moves*, O'Reilly Radar, 20/04/11, <http://radar.oreilly.com/2011/04/apple-location-tracking.html>

Alphabet Annual Report 2016. Available at: <http://www.annualreports.com/Company/google-inc>

Andreassen C. (2015), *Online social network site addiction: a comprehensive review*. Current Addiction Reports, 2(2): 175-184.

Arthur C. (2011), *Android phones record user-locations according to research*, The Guardian, 21/04/11, <https://www.theguardian.com/technology/2011/apr/21/android-phones-record-user-locations>

Ashley D., *The seven V's of big data*, Impact Radius, 07/04/16, <https://www.impactradius.com/blog/7-vs-big-data/>

Auchard E. and Steitz C. (2015), *German court bans Uber's unlicensed taxi services*, Reuters, 18/03/15, <https://www.reuters.com/article/us-uber-germany-ban/german-court-bans-ubers-unlicensed-taxi-services-idUSKBN0ME1L820150318>

Autorité de la concurrence (2014), *Décision No 14-D-06 du 8 juillet 2014 relative à des pratiques mises en œuvre par la société Cegecim dans le secteur des bases de données d'informations médicales*.

Autorité de la concurrence and Bundeskartellamt (2016), *Competition Law and Data*. Available at: <http://www.autoritedelaconcurrence.fr/doc/reportcompetitionlawanddatafinal.pdf>

Azevedo F. and Maciejewski M. (2015), *Social, Economic and Legal Consequences of Uber and Similar Transportation Network Companies (TNCs)*, Briefing, PE 563.398, European Parliament.

Bakshy E., Eckles D., Yan R., and Rosenn I. (2012), *Social influence in social advertising: Evidence from field experiments*. Proceedings of the 13th ACM Conference on Electronic Commerce (EC), June 8–12, Valencia, Spain.

Bakshy E., Messing S., and Adamic L. (2015), *Exposure to ideologically diverse news and opinion on Facebook*. *Science*, 348(6239): 1130-1132.

Barainsky L., Gumberidze E., and Nurul M. A. (2016), *Uber and Taxi Regulations – are Member States preserving a legal monopoly to the detriment of consumers?*. Case Study within the framework of the course “Case Studies related to the Law and Economics of European Competition Policy”. Available at: https://www.researchgate.net/profile/Mohammad_Nurul_Amin/publication/309679194_Case_Study_Uber-Solution_European_Competition_Law/links/581ce5d208aeccc08aecca320/Case-Study-Uber-Solution-European-Competition-Law.pdf

Bardhi F. e Eckhardt G. (2012), *Access based consumption: the case of car sharing*. *Journal of Consumer Research*, 39: 881-898.

Bassi E., Ciurcina M., De Martin J.C., Fenoglietto S., Rocchi G., and Sagarra Pascual O. (2017), *Legal frameworks for digital commons DECODE OS and legal guidelines*, D 1.8 of DECODE project.

Bauwens, M. (2014), *Peer to peer. De circulaire stad*. Pakhuis De Zwijger, Amsterdam.

Beck M. (2010), *Google+ Is No Longer A Requirement For Creating A Google Account*, *Marketing Land*, 19/09/14, <https://marketingland.com/google-plus-drops-mandatory-link-to-gmail-100826>

Belk R. (2014), *Sharing versus pseudo-sharing in Web 2.0*, *Anthropologist*, 18(1): 7-23.

Bellotti V., Ambard A., Turner D., Gossmann C., Demkova K. and Carroll J. M. (2015), *A Muddle of Models of Motivation for Using Peer-to-Peer Economy Systems*. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*: 1085–1094.

Bellotti V., Ambard A., Turner D., Gossmann C., Demkova K., and Carroll J. M. (2015), *A Muddle of Models of Motivation for Using Peer-to-Peer Economy Systems* (pp. 1085–1094). In: *Proceedings of ACM Conference on Human Factors in Computing Systems*: 1085-1094.

Berg J. (2016), *Income Security in the On-Demand Economy: Findings and Policy Lessons from a Survey of Crowdworkers*, *Comparative Labour Law and Policy Journal*, 37(3): 543-576.

Bergen M. and Mehrotra K. (2017), *Alphabet's Waymo Alleges Uber Stole Self-Driving Secrets*, 23/02/17, <https://www.bloomberg.com/news/articles/2017-02-23/alphabet-s-waymo-sues-uber-for-stealing-self-driving-patents>

Bergin T. (2017), *Exclusive - Loophole allows Uber to avoid UK tax, undercut rivals*, *Reuters*, 07/06/17, <https://uk.reuters.com/article/uk-uber-tax-britain/exclusive-loophole-allows-uber-to-avoid-uk-tax-undercut-rivals-idUKKBN18Y1Z6>

Bernstein M. S., Bakshy E., Burke M. and Karrer B. (2013), *Quantifying the invisible audience in social networks*. In: Proceedings of the ACM Conference on Human Factors in Computing Systems, 21-30.

Bhuiyan J. (2017), *Everything you need to know about Uber's turbulent 2017*, Recode, 20/08/17, <https://www.recode.net/2017/8/20/16164176/uber-2017-timeline-scandal>

Bhuiyan J. and Warzel C. (2014), "God View": *Uber Investigates Its Top New York Executive For Privacy Violations*, BuzzFeed, 19/09/14, https://www.buzzfeed.com/johanabhuiyan/uber-is-investigating-its-top-new-york-executive-for-privacy?utm_term=.nc97y8xP20#.dw56YbJZyD

Bianchi Dennerlein E. and Bria F. (2015), *Managing the Knowledge Commons: Interview with Carlo Vercellone*, 16/07/15, <https://www.nesta.org.uk/blog/managing-knowledge-commons-interview-carlo-vercellone>

Bodoni S. (2014), *Google Fined Maximum French Penalty for Privacy Violations*, Bloomberg, 08/01/14, <https://www.bloomberg.com/news/articles/2014-01-08/google-fined-maximum-french-penalty-for-privacy-violations>

Boffey D. (2017), *Google appeals against EU's €2.4bn fine over search engine results*, The Guardian, 11/09/17, <https://www.theguardian.com/technology/2017/sep/11/google-appeals-eu-fine-search-engine-results-shopping-service>

Bond R. M., Fariss C. J., Jones J. J., Kramer A. D. I., Marlow C., Settle, J. E., and Fowler, J. H. (2012), *A 61-million-person experiment in social influence and political mobilization*. Nature 489: 295–298.

Bork H. R. and J. G. Sidak (2012), *What Does the Chicago School Teach About Internet Search and the Antitrust Treatment of Google?*. Journal of Competition Law & Economics, 8(4): 663–700.

Borra E., Weltevrede E., Ciuccarelli P., Kaltenbrunner A., Laniado D., Magni G., Mauri M., Rogers R. and Venturini T. (2015), *Societal controversies in Wikipedia articles*. In: Proceedings of the 33rd annual ACM conference on human factors in computing systems (CHI '15). ACM, 193–196.

Bower J. L. and Christensen C. M. (1995), *Disruptive technologies: Catching the wave*, Harvard Business Review, 73: 43-54.

Boyd D. and Crawford K. (2012), *Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon*. Information, communication & society, 15(5): 662-679.

Boyd D. and Ellison N. (2008), *Social network sites: Definition, history, and scholarship*. Journal of Computer Mediated Communication, 13(1): 210-230.

Bria F., Ruiz J, Galdon Clavell G., Zavara J-M., Fitchner L., Halpin H. (2015), *Research on Identity Ecosystem*, D3.3 for D-Cent Project,

https://www.nesta.org.uk/sites/default/files/research_on_digital_identity_ecosystems.pdf

Bria, F. (2017) Public policies for digital sovereignty. In *Ours to Hack and to Own. The rise of platform cooperativism, a new vision for the future of work and a fairer internet.*

Available at

https://www.academia.edu/19102224/Public_policies_for_digital_sovereignty

Bright S. (2017), *After Trump, "big data" firm Cambridge Analytica is now working in Kenya*, BBC News, 03/08/17, <http://www.bbc.com/news/blogs-trending-40792078>

Burguet R., Caminal R. And Ellman M. (2013), *In Google we trust?*. Barcelona GSE Working Paper Series, Working Paper No. 717.

Burri M. and Schär R. (2016), *The Reform of the EU Data Protection Framework: Outlining Key Changes and Assessing Their Fitness for a Data-driven Economy.* Journal of Information Policy, 6: 479-511.

Business Roundtable (2015), *Putting data to work. Maximizing the Value of Information in an Interconnected World.* Available at:

<http://businessroundtable.org/sites/default/files/reports/BRT%20PuttingDataToWork.pdf>

Business Wire, *New IDC Forecast Sees Worldwide Big Data Technology and Services Market Growing to \$48.6 Billion in 2019, Driven by Wide Adoption Across Industries*, 09/11/15, <http://www.businesswire.com/news/home/20151109005070/en/New-IDC-Forecast-Sees-Worldwide-Big-Data>

Butler S. and Gwyn T. (2017), *Uber stripped of London licence due to lack of corporate responsibility*, The Guardian, 23/09/17,

<https://www.theguardian.com/technology/2017/sep/22/uber-licence-transport-for-london-tfl>

Butler S. and Topham G. (2017), *Uber stripped of London licence due to lack of corporate responsibility*, The Guardian, 23/09/17,

<https://www.theguardian.com/technology/2017/sep/22/uber-licence-transport-for-london-tfl>

California Public Utilities Commission (2013), Decision 13-09-045 Adopting Rules and Regulations to Protect Public Safety while Allowing New Entrants to the Transportation Industry. Available at:

<http://docs.cpuc.ca.gov/publisheddocs/published/g000/m077/k192/77192335.pdf>

Carson B. (2016), *Uber agrees to pay \$28.5 million to end lawsuit about safety ads*, Business Insider, 11/02/16, <http://www.businessinsider.fr/us/uber-pays-285-million-in-safety-settlement-2016-2/>

CB Insights (2015), *Just 3 Unicorn Startups Take The Majority Of On-Demand Funding in 2015*, 03/03/16, <https://www.cbinsights.com/research/on-demand-funding-top-companies/>

CB Insights (2015), *The On-Demand Report* (homepage), <https://www.cbinsights.com/research-on-demand-report>

Celata F., Hendrickson C. Y. and Sanna V. S. (2017), *The sharing economy as community marketplace? Trust, reciprocity and belonging in peer-to-peer accommodation platforms*. Cambridge Journal of Regions, Economy and Society, 10(2): 349-363.

Chang J., Rosenn I., Backstrom L., and Marlow C. (2010), *ePluribus: Ethnicity on social networks*. Fourth International AAAI Conference on Weblogs and Social Media (ICWSM). AAAI Press.

Chapman B. (2017), *Uber banned in Italy nationwide after court rules app provides unfair competition to taxi drivers*, The Independent, 11/04/17, <http://www.independent.co.uk/news/business/news/uber-italy-ban-app-taxi-driver-unfair-competition-court-ruling-decision-trade-unions-legal-action-a7677881.html>

Chaykowski K. (2016), *Facebook Extends Its Ad Network To Mobile Websites*, Forbes, 20/01/16, <https://www.forbes.com/sites/kathleenchaykowski/2016/01/26/facebook-extends-its-ad-network-to-the-mobile-web/#1fe829b7132e>

Christensen C. M. (1997), *The innovator's dilemma: When new technologies cause great firms to fail*. Harvard Business School Press, Boston.

Christensen C. M. and Raynor M. E. (2003), *The innovator's solution: Creating and sustaining successful growth*. Harvard Business School Press, Boston.

Christensen L., Colciago A., Etro F., and Rafert G. (2013), *The Impact of the Data Protection Regulation in the E.U.*. International Think-tank on Innovation and Competition - INTERTIC. Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.657.138&rep=rep1&type=pdf>

Church Z. (2011), *Google's Schmidt: 'Global mind' offers new opportunities*, MIT News, 15/11/11, <http://news.mit.edu/2011/schmidt-event-1115>

Ciriani S. (2015), *The Economic Impact of the European Reform of Data Protection*. Communications & Strategies, 97: 41-58.

Cleland S. (2007), *Googleopoly: The Google-DoubleClick Anti-Competitive Case*, 17/07/07, <http://googleopoly.net/wp-content/uploads/2012/07/googleopoly.pdf>

CNIL (2017), *Facebook sanctionné pour de nombreux manquements à la loi Informatique et Libertés*, Commission Nationale de l'Informatique et des Libertés, 16/05/17, <https://www.cnil.fr/en/facebook-sanctioned-several-breaches-french-data-protection-act>

COM/2016/0356 (2016), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - *A European agenda for the collaborative economy*. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2016:0356:FIN>

Court of Justice of the European Union (2017), *Advocate General's Opinion in Case C-434/15, Asociación Profesional Elite Taxi v Uber Systems Spain, SL*. Available at: <https://curia.europa.eu/jcms/upload/docs/application/pdf/2017-05/cp170050en.pdf>

Crawford K. and Boyd D. (2011), *Six Provocations for Big Data*. Presented at Oxford Internet Institute's "A Decade in Internet Time: Symposium on the Dynamics of the Internet and Society" on September 21, 2011.

D. G. Cockayne (2016), *Sharing and neoliberal discourse: The economic function of sharing in the digital on-demand economy*. *Geoforum*, 77: 73–82.

Danielsson J., Micheler E., Neugebauer K., Uthemann A., and Zigrand J. P. (2015), *Europe's proposed capital markets union: Disruption will drive investment and innovation*, VOX – CEPR's policy portal, 23/02/15, <http://voxeu.org/article/europe-s-proposed-capital-markets-union>

Dara Khosrowshahi (2017), *2016 Data Security Incident*, UBER Newsroom, 21/11/17, https://www.uber.com/newsroom/2016-data-incident/?utm_term=wyzzGzzR2ch1q60CeTYs2LzUkmRPjQBnwi2yc0&adg_id=218769&cid=10078&utm_campaign=affiliate-ir-Skimbit%20Ltd._1_99_national_D_all_ACQ_cpa_en&utm_content=&utm_source=affiliate-ir

Davies A. (2017), *With Uber Freight Travis Takes on Trucking*, *Wired*, 18/05/17, <https://www.wired.com/2017/05/uber-freight/>

Davies R. (2017), *Uber loses appeal in UK employment rights case*, *The Guardian*, 10/11/17, <https://www.theguardian.com/technology/2017/nov/10/uber-loses-appeal-employment-rights-workers>

Davies S. (2013), *Complaint lodged with the Data Protection Authorities of Norway, Sweden, Czech Republic, Denmark, France, Spain, Italy, Slovenia, Austria, Belgium, Germany (Federal and Berlin), Lithuania, Netherlands and Poland*, *The Privacy Surgeon*, 26/11/13. Available at: <http://www.privacysurgeon.org/blog/wp-content/uploads/2013/11/Google-shared-endorsement-complaint.pdf>

De Mauro A., Greco M., and Grimaldi M. (2015), *What is big data? A consensual definition and a review of key research topics*. In: AIP conference proceedings, 1644(1): 97-104.

Demange G. and Gale D. (1985), *The Strategy Structure of Two-sided Matching Markets*. *Econometrica*, 53(4): 873-888.

Department of Justice (DOJ) - Antitrust Division (2014), *United States of America v. Bazaarvoice*, Competitive Impact Statement, Case No. 13-cv-00133 WHO.

Dewey C. (2016), *98 personal data points that Facebook uses to target ads to you*, The Washington Post, 19/08/16, https://www.washingtonpost.com/news/the-intersect/wp/2016/08/19/98-personal-data-points-that-facebook-uses-to-target-ads-to-you/?utm_term=.038a29370111

Dillet R. (2016), *Uber acquires Otto to lead Uber's self-driving car effort*, TechCrunch, 18/08/16, <https://techcrunch.com/2016/08/18/uber-acquires-otto-to-lead-ubers-self-driving-car-effort-report-says/>

Directive 2000/31/EC (2000), Directive of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ('Directive on electronic commerce'). Official Journal L 178.

Directive 2006/123/EC (2006), Directive of the European Parliament and of the Council of on services in the internal market. Official Journal L 376/36.

Directive 95/46/EC (1995), Directive of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data. Official Journal L 281.

Directorate General for Internal Policies (2012), *Data Protection Review: Impact on EU Innovation and Competitiveness*, Study. Available at: [http://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/492463/IPOL-ITRE_ET\(2012\)492463_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/492463/IPOL-ITRE_ET(2012)492463_EN.pdf)

Directorate General for Internal Policies (2015), *Over-the-top-players (OTTs): Study for the IMCO Committee*. Available at: [http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU\(2015\)569979_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU(2015)569979_EN.pdf)

DPA's of The Netherlands, France, Spain, Hamburg and Belgium (2017), *Common Statement by the Contact Group of the Data Protection Authorities of The Netherlands, France, Spain, Hamburg and Belgium*, 16/05/17, https://autoriteitpersoonsgegevens.nl/sites/default/files/atoms/files/common_statement_16_may_2017.pdf

Driegert B. (2017), *Introducing more of what you want on Uber Freight*, UBER Newsroom, 03/08/17, <https://www.uber.com/newsroom/uberfreightexpansion/>

Dudovskiy J. (2017), *Microsoft Business Strategy and Competitive Advantage*, Research Methodology, 13/05/17, <https://research-methodology.net/microsoft-business-strategy-and-competitive-advantage/>

Dwoskin E. (2017), *Uber founder Travis Kalanick resigns as CEO amid a shareholder revolt*, The Washington Post, 21/06/17, https://www.washingtonpost.com/business/technology/2017/06/21/cecb34bc-564e-11e7-ba90-f5875b7d1876_story.html?utm_term=.6e63c9629ce6

Dwoskin E. and Timberg C. (2017), *Justice Department opens criminal probe into Uber*, The Washington Post, 04/05/17, https://www.washingtonpost.com/news/the-switch/wp/2017/05/04/justice-department-opens-criminal-probe-into-uber/?utm_term=.014a24e4704c

Dyal-Chand R. (2015), *Regulating Sharing: The Sharing Economy as an Alternative Capitalist System*. School of Law Faculty Publications, Paper No 38.

Edelman B. e Luca M. (2014), *Digital Discrimination: The Case of Airbnb.com*, Harvard Business School, Working Paper No 14-054.

Edwards J. (2017), *Uber drivers tell us Travis Kalanick is wrong: Uber *has* paid them less over time*, Business Insider, 04/03/17, <http://uk.businessinsider.com/uber-travis-kalanick-drivers-paid-less-2017-3?IR=T>

Efrati A. (2017), *Uber's Top Secret "Hell" Program Exploited Lyft's Vulnerability*, The Independent, 12/04/17, <https://www.theinformation.com/ubers-top-secret-hell-program-exploited-lyfts-vulnerability>

Einav L., Farronato C., and Levin J. (2015), *Peer-to-Peer Markets*. Stanford Institute for Economic Policy Research. Discussion Paper No. 15 029.

Eisenmann T., Parker G., and Alstyne V.W. (2006), *Strategies for two-sided markets*. Harvard Business Review, 84(10): 92.

Electronic Privacy Information Center – EPIC (2015), *Request for Investigation, Injunction, and Other Relief Submitted by The Electronic Privacy Information Center*. Federal Trade Commission, 22 June 2015, <https://epic.org/privacy/internet/ftc/uber/Complaint.pdf>

Engels B. (2016), *Data portability among online platforms*. Internet Policy Review, 5(2).

Esayas S. Y. (2017), *Competition in Dissimilarity: Lessons in Privacy from the Facebook/WhatsApp Merger*. CPI Antitrust Chronicle, 1(2): 57- 64.

Etherington D. (2014), *Uber Begins Testing Lunch Delivery With UberFRESH*, TechCrunch, 26/08/14, <https://techcrunch.com/2014/08/26/uberfresh/>

Euractiv (2017), *EU Court's top lawyer says member states have right to ban Uber*, 04/07/17, <https://www.euractiv.com/section/future-of-mobility/news/eu-courts-top-layer-says-member-states-have-right-to-ban-uber/>

European Centre for International Political Economy - ECIPE (2013), *The Economic Importance of Getting Data Protection Right: Protecting Privacy, Transmitting Data, Moving Commerce*. Available at: https://www.uschamber.com/sites/default/files/documents/files/020508_EconomicImportance_Final_Revised_Ir.pdf

European Cloud Partnership Steering Board (2014), *Establishing a Trusted Cloud Europe*. Available at: <https://www.kowi.de/Portaldata/2/Resources/horizon2020/coop/Report-Establishing-trusted-cloud-Europe.pdf>

European Commission (2004), *Guidelines on the effect on trade concept contained in Articles 81 and 82 of the Treaty* (2004/C 101/07), Official Journal C 101.

European Commission (2008a), Case No. COMP/M.4731 – *Google/DoubleClick*, 11/03/08.

European Commission (2008b), Case No. COMP/M.4854 – *TomTom/Tele Atlas*, 14/05/08.
European Commission (2009a), Case COMP/C-3/37.990 – *Intel*, 13/05/09.

European Commission (2009b), *Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings* (2009/C 45/02), Official Journal C 45/7.

European Commission (2011), Case COMP/39.692 - *IBM Maintenance Services*, 13/12/11.

European Commission (2012), Press Release, *Commission proposes a comprehensive reform of data protection rules to increase users' control of their data and to cut costs for businesses*. Available at: http://ec.europa.eu/justice/newsroom/data-protection/news/120125_en.htm

European Commission (2013), *Open platforms for web based applications and services in Europe, enlarging the stakeholders community*. Available at: <https://publications.europa.eu/en/publication-detail/-/publication/125d3e49-b398-4487-8441-cfb59e179d91>

European Commission (2014), Case No. COMP/M.7217 - *Facebook/WhatsApp*, 03/10/14.

European Commission (2015a), *Action Plan on Building a Capital Markets Union*. Available at: https://ec.europa.eu/info/publications/action-plan-building-capital-markets-union_en

European Commission (2015b), *Fact Sheet - Antitrust: Commission opens formal investigation against Google in relation to Android mobile operating system*, 15/04/15. Available at: [http://europa.eu/rapid/press-release MEMO-15-4782_en.htm](http://europa.eu/rapid/press-release_MEMO-15-4782_en.htm)

European Commission (2015c), *Fact Sheet - Antitrust: Commission sends Statement of Objections to Google on comparison shopping service*, 15/04/15. Available at: [http://europa.eu/rapid/press-release MEMO-15-4781_en.htm](http://europa.eu/rapid/press-release_MEMO-15-4781_en.htm)

European Commission (2015d), *Public Consultation on Modernising VAT for cross-border e-commerce*. Available at: https://ec.europa.eu/taxation_customs/consultations-get-involved/tax-consultations/public-consultation-modernising-vat-crossborder-ecommerce_en

European Commission (2016), *Press Release - Antitrust: Commission takes further steps in investigations alleging Google's comparison shopping and advertising-related practices*

breach EU rules, 14/07/16. Available at: http://europa.eu/rapid/press-release_IP-16-2532_en.htm

European Commission (2016), *Press Release - Antitrust: Commission sends Statement of Objections to Google on Android operating system and applications*, 20/04/16. Available at: http://europa.eu/rapid/press-release_IP-16-1492_en.htm

European Commission (2016), *Press Release - Mergers: Commission alleges Facebook provided misleading information about WhatsApp takeover*, 20/12/16. Available at: http://europa.eu/rapid/press-release_IP-16-4473_en.htm

European Commission (2016), *The EU Data Protection Reform and Big Data Factsheet*. Available at: http://ec.europa.eu/justice/data-protection/files/data-protection-big-data_factsheet_web_en.pdf

European Commission (2017a), *Fact Sheet - Antitrust: Commission fines Google €2.42 billion for abusing dominance as search engine by giving illegal advantage to own comparison shopping service*, 27/06/17. Available at: http://europa.eu/rapid/press-release_MEMO-17-1785_en.htm

European Commission (2017b), *Press Release - Mergers: Commission fines Facebook €110 million for providing misleading information about WhatsApp takeover*, 18/05/17. Available at: http://europa.eu/rapid/press-release_IP-17-1369_en.htm

European Court of Justice (1981), Case 60-81 - *International Business Machines Corporation v Commission of the European Communities*, 11/11/81.

European Court of Justice (2007), Case T-201/04 - *Microsoft Corp. v Commission of the European Communities*, 17/09/07.

European Data Protection Supervisor (2014), *Privacy and competitiveness in the age of big data: The interplay between data protection, competition law and consumer protection in the Digital Economy*. Available at: https://edps.europa.eu/sites/edp/files/publication/14-03-26_competition_law_big_data_en.pdf

European Data Protection Supervisor (EDPS), *Opinion 8/16*, 23/09/16. Available at: https://edps.europa.eu/sites/edp/files/publication/16-09-23_bigdata_opinion_en.pdf

Evans D. (2008), *The Economics of the Online Advertising Industry*. *Review of Network Economics*, 7(3): 359–391.

Evans D. S. and Schmalensee R. (2007), *The industrial organization of markets with two-sided platforms*. *Competition Policy International*, 3(1): 151-179.

Evans P. C. and Gawer A. (2016). *The rise of the platform enterprise: a global survey*. The Emerging Platform Economy Series No. 1, Center for Global Enterprise. Available at: https://thecge.net/wp-content/uploads/2016/01/PDF-WEB-Platform-Survey_01_12.pdf

Facebook Annual Report (2016). Available at:
<http://www.annualreports.com/Company/facebook>

Fairless T. (2015), *Uber Files Complaints Against European Governments Over Bans*, The Wall Street Journal, 01/04/15, <https://www.wsj.com/articles/uber-files-complaints-against-european-governments-over-bans-1427885946>

Favre L. (2015), *It's 10 years since Google bought Android: here are the highlights from Cupcake to Lollipop*, AndroidPIT, 14/07/15, <https://www.androidpit.com/the-sweet-history-of-android>

Federal Trade Commission (2007), *Statement concerning Google/DoubleClick*, File No. 071-0170, 20/12/07. Available at: <https://www.ftc.gov/news-events/press-releases/2007/12/federal-trade-commission-closes-googledoubleclick>

Federal Trade Commission (2012a), *Press Release - Google Will Pay \$22.5 Million to Settle FTC Charges it Misrepresented Privacy Assurances to Users of Apple's Safari Internet Browser*, 09/008/12, <https://www.ftc.gov/news-events/press-releases/2012/08/google-will-pay-225-million-settle-ftc-charges-it-misrepresented>

Federal Trade Commission (2012b), *Protecting Consumer Privacy in an Era of Rapid Change: Recommendations for Businesses and Policymakers*. Available at: <http://ftc.gov/os/2012/03/120326privacyreport.pdf>

Federal Trade Commission (2013), *Statement regarding Google's Search Practices In the Matter of Google Inc.*, File No 111-0163, 03/01/13. Available at: https://www.ftc.gov/system/files/documents/public_statements/295971/130103googlesearchstmtofcomm.pdf

Federal Trade Commission (2014), *Data Brokers: A Call for Transparency and Accountability*. Available at: <https://www.ftc.gov/system/files/documents/reports/data-brokers-call-transparency-accountability-report-federal-trade-commission-may-2014/140527databrokerreport.pdf>

Filistrucchi L., Geradin D., van Damme E. (2013), *Identifying two-sided markets*. World competition, 36(1): 33-59.

Filistrucchi L., Geradin D., van Damme E., and Affeldt P. (2014), *Market Definition in two-sided markets: theory and practice*. Journal of Competition Law & Economics, 10(2): 293-339.

Fox-Brewster T. (2017), *FTC: Uber Failed To Protect 100,000 Drivers In 2014 Hack*, Forbes, 15/08/17, <https://www.forbes.com/sites/thomasbrewster/2017/08/15/uber-settles-ftc-complaint-over-security-and-privacy/#2ad3f45a88da>

Friedman G. (2014), *Workers without employers: shadow corporations and the rise of the gig economy*. Review of Keynesian Economics 4(1): 171-88.

Friedman G. (2014), *Workers without Employers: Shadow Corporations and the Rise of the Gig Economy*. Review of Keynesian Economics, 2: 171-188.

FTC website (2017), *Uber Settles FTC Allegations that It Made Deceptive Privacy and Data Security Claims*, 15/08/17, <https://www.ftc.gov/news-events/press-releases/2017/08/uber-settles-ftc-allegations-it-made-deceptive-privacy-data>

Fuster Morell M., Carballa Smichowski B., Smorto G., Espelt R., Imperatore P., Rebordosa M., Rocas M., Rodríguez N., Senabre E., and Ciurcina M. (2017), *Multidisciplinary Framework on Commons Collaborative Economy*. D 2.1 of DECODE project. Available at: <https://desk.dyne.org/s/I9IMbexVEDzHEks#pdfviewer>

Gantz J. and Reinsel D. (2012), *The Digital Universe in 2020: Big Data, Bigger Digital Shadows, and Biggest Grow the in the Far East*. IDC iView, sponsored by EMC Corporation. Available at: <https://www.emc.com/collateral/analyst-reports/idc-the-digital-universe-in-2020.pdf>

Gebicka A. and Heinemann A. (2014), *Social Media & Competition Law*. World Competition 37(2): 149-172.

Geradin D. (2015), *Should Uber be Allowed to Compete in Europe? And if so How?*. Competition Policy International. Forthcoming in: Competition Policy International (2015); George Mason Legal Studies Research Paper No. LS 15-11; George Mason Law & Economics Research Paper No. 15-29.

Gibbs S. (2017), *Uber pulls U-turn on controversial tracking of users after trip has ended*, The Guardian, 29/08/17, <https://www.theguardian.com/technology/2017/aug/29/uber-u-turn-tracking-users-after-trip-ended-app-user-privacy-new-ceo>

Graef I. (2015), *Market Definition and Market Power in Data: The case of Online Platforms*. World competition: Law and Economics Review, 38(4): 473-506.

Gurran N. and Phibbs P. (2017), *How Should Urban Planners Respond to Airbnb?*. Journal of the American Planning Association, 83(1): 80–92.

Guttentang D. (2013), *Airbnb: Disruptive Innovation and the Rise of an Informal Tourism Accommodation Sector*. Current Issues in Tourism, 18(12): 1192- 1217.

Hagiu A. and Wright J. (2011), *Multi-sided platforms*. Harvard Business School, Working Paper No. 12024.

Hall J. and Krueger A. (2015), *An Analysis of the Labor Market for Uber’s Driver-Partners in the United States*. Princeton University, Industrial Relations Section, Working Paper No. 587.

Hamari J., Sjöklint M., and Ukkonen, A. (2016), *The sharing economy: Why people participate in collaborative consumption*. Journal of the Association for Information Science and Technology, 67: 2047–2059.

Helft M. (2012), *Fortune Exclusive: Larry Page on Google*, Fortune, 11/02/12, <http://fortune.com/2012/12/11/fortune-exclusive-larry-page-on-google/>

Henten A. and Windekilde I. (2015), *Transaction costs and the sharing economy*. 26th European Regional Conference of the International Telecommunications Society (ITS).

Hern A. (2016), *Google sued over policies 'barring employees from writing novels'*, the Guardian, 21/12/16, <https://www.theguardian.com/technology/2016/dec/21/google-sued-policies-barring-employees-writing-novels>

Hern A. (2017), *Uber allegedly used secret program to undermine rival Lyft*, The Guardian, 13/04/17, <https://www.theguardian.com/technology/2017/apr/13/uber-allegedly-used-secret-program-to-cripple-rival-lyft>

Hern A. (2017), *Whatever happened to the DeepMind AI ethics board Google promised?*, The Guardian, 26/01/17, <https://www.theguardian.com/technology/2017/jan/26/google-deepmind-ai-ethics-board>

Hobbs W. and M. Burke (2017), *Connective Recovery in Social Networks After the Death of a Friend*. Nature Human Behaviour, 1 (92): 1–6.

Hofheinz P. and Mandel M. (2014), *Bridging the data gap. How digital innovation can drive growth and create jobs*. The Lisbon Council and the Progressive Policy Institute (PPI), Issue 15/2014.

Holt R., Macdonald A., and Gore-Coty P. D. (2017), *5 Billion Trips*, UBER Newsroom, 29/06/17, <https://newsroom.uber.com/5billion/>

Huston C. (2015), *As Airbnb grows, hotel prices expected to drop*, Market Watch, 13/08/15, www.marketwatch.com/story/as-airbnb-grows-hotel-prices-expected-to-drop-2015-08-13

IBM Marketing Cloud (2017), *10 Key Marketing Trends for 2017 and Ideas for exceeding customer expectations*. Available at: <https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=WRL12345USEN>

IDdate (2014), *Digiworld Yearbook 2014, Les Enjeux du Monde Numérique*. Institut De l'Audiovisuel et des Télécommunication en Europe – IDATE (2014).

Ikkala T. and Lampinen A. (2015), *Monetizing network hospitality: Hospitality and sociability in the context of Airbnb*. In: Proceedings of the Eighteenth ACM Conference on Computer Supported Cooperative Work & Social Computing, 1033-1044.

Isaac M. (2017), *How Uber Deceives the Authorities Worldwide*, The New York Times, 03/03/17, <https://www.nytimes.com/2017/03/03/technology/uber-greyball-program-evade-authorities.html>

Isaac M. and Singer N. (2015), *California Says Uber Driver Is Employee, Not a Contractor*, The New York Times, 17/06/15, <https://www.nytimes.com/2015/06/18/business/uber-contests-california-labor-ruling-that-says-drivers-should-be-employees.html>

Issenberg S. (2012), *How Obama's Team Used Big Data to Rally Voters*, MIT Technology Review, 19/12/12, <https://www.technologyreview.com/s/509026/how-obamas-team-used-big-data-to-rally-voters/>

Jiménez Cano R. (2014), *Taxi app Uber closes service in Spain in wake of judicial order*, El País, 31/12/14, https://elpais.com/elpais/2014/12/31/inenglish/1420015710_525837.html?rel=mas

Johns Hopkins Medicine (2013), *The Facebook Effect: Social Media Dramatically Boosts Organ Donor Registration*, John Opkins' New Release, 18/12/13, http://www.hopkinsmedicine.org/news/media/releases/the_facebook_effect_social_media_dramatically_boosts_organ_donor_registration

Jonathan Rosenberg (2011), *Google's VP of Product Management and Marketing*, TMCnet.com, 29/09/11, <http://www.tmcnet.com/usubmit/2011/09/29/5814369.htm>

Jones Harbour P. (2007), *Dissenting Statement of Commissioner Pamela Jones Harbour*, Google/DoubleClick, FTC file No. 071-0170, 20/12/2007. Available at: https://www.ftc.gov/sites/default/files/documents/public_statements/statement-matter-google/doubleclick/071220harbour_0.pdf

Jullien B. (2005), *Two-Sided Markets and Electronic Intermediaries*. CESifo Economic Studies, 51(2-3): 233-260.

Kaplan A. and Haenlein M. (2010), *Users of the world, unite! The challenges and opportunities of social media*. Business Horizons, 53(1): 59 - 68.

Kasmir, S. (1996), *The Myth of Mondragon: Cooperatives, Politics, and Working Class Life in a Basque Town*. SUNY Press, Albany, NY.

Kenney M. and Zysman J. (2016). *The Rise of the Platform Economy*. Issues in Science and Technology 32(3): 61–69.

Khan S. (2017), *Uber deserved to lose its licence – Londoners' safety must come first*, The Guardian, 22/09/17, <https://www.theguardian.com/commentisfree/2017/sep/22/uber-ban-london-safety>

Kietzman J. H., Hermkens K., McCarthy I. P., and Silvestre, B. S. (2011), *Social media? Get serious! Understanding the functional building blocks of social media*. Business Horizons, 54(3): 241-251.

Kirchgaessner S. (2015), *Uber ordered to discontinue Pop service in Italy*, The Guardian, 26/05/15, <https://www.theguardian.com/technology/2015/may/26/uber-pop-italy-order-discontinue-unfair-competition-taxi>

Kollewe J. and Topham G. (2017), *Uber apologises after London ban and admits 'we got things wrong'*, 25/09/17, <https://www.theguardian.com/business/2017/sep/25/uber-tfl-concerns-vows-keep-operating-london-licence>

Kominers D. S. (2017), *Uber's New Pricing Idea Is Good Theory, Risky Business*, Bloomberg, 13/06/17, <https://www.bloomberg.com/view/articles/2017-06-13/uber-s-new-pricing-idea-is-good-theory-risky-business>

Kong L. (2010), *Data Protection and Transborder Data Flow in the European and Global Context*. *European Journal of International Law*, 21(2): 441-456.

Korosec K. (2017), *Why the Dismissed Uber 'Hell' Program Lawsuit Could Come Back*, Fortune, 31/08/17, <http://fortune.com/2017/08/31/uber-hell-lawsuit-dismissed/>

Kosinski M., Stillwell D., and Graepel T. (2013), *Private traits and attributes are predictable from digital records of human behavior*. *Proceedings of the National Academy of Sciences*, 110(15): 5802–5805.

Kostakis V. and Bauwens M. (2014), *Network Society and Future Scenarios for a Collaborative Economy*. Palgrave Macmillan, London.

Kramer A. D. I. and Chung C. K. (2011), *Dimensions of self-expression in Facebook status updates*. In: *Proceedings of the Fifth International Conference on Weblogs and Social Media*, 169-176.

Kramer A. D. I., Guillory J. E., and Hancock J. T. (2014), *Experimental evidence of massive-scale emotional contagion through social networks*. *Proceedings of the National Academy of Sciences*, 111: 8788–8790.

Kuchler H. (2017), *Female employees complain to Uber chief about 'systemic' sexism*, Financial Times, 24/02/17, <https://www.ft.com/content/e4fa1ed2-fab0-11e6-9516-2d969e0d3b65>

Kunashegaran S. (2017), *How Uber, Google, Facebook and Other Tech Giants Avoid Paying Billions in Tax?*, DCONSTRUCT, 30/04/17, <https://medium.com/dconstruct/how-uber-google-facebook-and-other-tech-giants-avoid-paying-billions-in-tax-365b7c8b7dbc>

Lande R. (2008), *The Microsoft-Yahoo Merger: Yes, Privacy is an Antitrust Concern*. FTC: Watch No. 714, University of Baltimore School of Law Legal Studies Research, Paper No. 2008-06. Available at: http://scholarworks.law.ubalt.edu/cgi/viewcontent.cgi?article=1721&context=all_fac

Laptev N., Smyl S., and Shanmugam S. (2017), *Engineering Extreme Event Forecasting at Uber with Recurrent Neural Networks*, UBER Engineering, 09/06/17, <https://eng.uber.com/neural-networks/>

Lastowka G. (2008), *Google's Law*. *Brooklyn Law Review*, 73(4): 1327-1410.

Laudadio Devine K. (2008), *Preserving competition in multi-sided innovative markets: how do you solve a problem like Google?*. *North Carolina Journal of Law and Technology*, 10(1): 59-118.

Lauterbach D., Truong H., Shah T., and Adamic L. (2009), *Surfing a web of trust: Reputation and reciprocity on CouchSurfing.com*. *IEEE SocialCom*, 4: 346-353.

- Lee D. (2016), *How Airbnb Short-Term Rentals Exacerbate Los Angeles's Affordable Housing Crisis: Analysis and Policy Recommendations*. Harvard Law & Policy Review, 10:229–254.
- Levin S. (2017), *Female Uber driver says company did nothing after passengers assaulted her*, The Guardian, 01/05/17, <https://www.theguardian.com/technology/2017/may/01/uber-sexual-assault-allegations-female-drivers-san-diego>
- Levy S. (2013), *Google's Larry Page on Why Moon shots Matters*, 17/01/13, <https://www.wired.com/2013/01/ff-qa-larry-page/2/>
- Leyden J. (2006), *Users protest over 'creepy' Facebook update*, The Register, 07/09/06, https://www.theregister.co.uk/2006/09/07/facebook_update_controversy/
- Lobel O. (2016), *The Law of the Platform*. Minnesota Law Review, 87: 117-66.
- Lomas N. (2017), *Spain's taxi drivers stage another anti-Uber strike*, TechCrunch, 30/05/17, <https://techcrunch.com/2017/05/30/spains-taxi-drivers-stage-another-anti-uber-strike/>
- Lucero, S. (2016). *IoT platforms: enabling the Internet of Things*. IHS Technology. Whitepaper. Available at: <https://cdn.ihs.com/www/pdf/enabling-IOT.pdf>
- Luchetta G. (2013), *Google opera in un mercato a due versanti? – Is the Google Platform a Two-Sided Market?*. Mercato Concorrenza Regole, 15(1): 83-117.
- Macchiati A. (2010), *I motori di ricerca su Internet e il mercato delle news. Profili antitrust e regolamentari - Search engines and the news: antitrust and regulation*. Mercato Concorrenza Regole, 3: 469-490.
- Markusson N., Venturini T., Laniado D., and Kaltenbrunner A. (2016), *Contrasting medium and genre on Wikipedia to open up the dominating definition and classification of geoengineering*. Big Data & Society, 3(2).
- Marshall J. (2014), *Facebook Extends Reach With New Advertising Platform*, The Wall Street Journal, 22/09/14, <https://www.wsj.com/articles/facebook-extends-reach-withad-platform-1411428726>
- McGoogan C. (2017), *Where has Uber run into trouble around the world?*, The Telegraph, 22/19/17, <http://www.telegraph.co.uk/technology/2017/09/22/has-uber-run-trouble-around-world/>
- McKinsey Global Institute (2011), *Big Data: The next frontier for innovation, competition, and productivity*. Available at: https://bigdatawg.nist.gov/pdf/MGI_big_data_full_report.pdf
- McNamara B. (2015), *Airbnb: A not-so-safe resting place*. Colorado Technology Law Journal, 13: 149-151.

- Meola A. (2016), *Facebook is shutting down Facebook Exchange*, Business Insider, 26/05/2016, <http://www.businessinsider.com/facebook-is-shutting-down-facebook-exchange-2016-5?IR=T>
- Miller J. I. (2005), Note "Don't Be Evil": Gmail's Relevant Text Advertisements Violate Google's Own Motto and Your E-Mail Privacy Rights. *Hofstra Law Review*, 33(4): 1632-1635.
- Morozov E. (2015), *Socialize the Data Centres!*, *New Left Review*, 91: 45-66.
- Morris Z. D. (2016), *Uber Will Spend \$500 Million on Mapping to Distance Itself from Google*, *Fortune*, 31/07/16, <http://fortune.com/2016/07/31/uber-mapping-google-alternative/>
- Munoz P. and Cohen B. (2017), *Mapping out the Sharing Economy: A Configurational Approach to Sharing Business Modeling*. *Technological Forecasting and Social Change*.
- Neely A. (2017), *French Presidential Candidate Running Data-Based Campaign*, *DMN News*, 10/9/17, <http://www.dmnews.com/dataanalytics/french-presidential-candidate-running-data-based-campaign/article/630614/>
- NERA Economic Consulting, *Airbnb's Global Support to Local Economies: Output and Employment*, March 2017, http://www.nera.com/content/dam/nera/publications/2017/NERA_Airbnb_Report_2017_03_13_final_revised.pdf
- Newcomer E. (2016), *Uber on course to lose more money than any tech company ever after \$1.2bn loss in six months*, *The Independent*, 26/08/16, <http://www.independent.co.uk/news/business/news/uber-loses-12bn-in-six-months-tech-company-lyft-didi-a7210666.html>
- Newcomer E. (2017), *Uber Paid Hackers to Delete Stolen Data on 57 Million People*, *Bloomberg*, 21/11/17, <https://www.bloomberg.com/news/articles/2017-11-21/uber-concealed-cyberattack-that-exposed-57-million-people-s-data>
- Newman N. (2013), *Search, Antitrust and the Economics of the Control of User Data*. *Yale Journal on Regulation*, 30(3).
- Noack R. (2017), *With new court loss in Britain, Europe becomes more of a minefield for Uber*, *The Washington Post*, 10/10/17, https://www.washingtonpost.com/news/worldviews/wp/2017/11/10/with-new-court-loss-in-britain-europe-becomes-more-of-a-minefield-for-uber/?utm_term=.3605cf9993e1
- Noren E. (2013), *Analysis of the Apple Business Model*, *Digital business models*, 18/02/13, <http://www.digitalbusinessmodelguru.com/2013/02/analysis-of-apple-inc-business-model.html>

O'Brien D. R. and Bensinger G. (2017), *Uber Faces FBI Probe Over Program Targeting Rival Lyft*, The Wall Street Journal, 08/09/17, <https://www.wsj.com/articles/uber-faces-fbi-probe-over-program-targeting-rival-lyft-1504872001>

O'Connor S. and Ram A. (2017), *Uber loses appeal in UK employment case*, Financial Times, 10/11/17, <https://www.ft.com/content/84de88bc-c5ee-11e7-a1d2-6786f39ef675>

OECD (2007), *Participative Web: User-Created Content*. Available at: <https://www.oecd.org/sti/38393115.pdf>

OECD (2013), *OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data*. Available at: <http://www.oecd.org/sti/ieconomy/oecdguidelinesontheProtectionofPrivacyandTransborderFlowsOfPersonalData.htm>

OECD (2014), *Data-driven Innovation for Growth and Well-being: Interim Synthesis Report*. Available at: <https://www.oecd.org/sti/inno/data-driven-innovation-interim-synthesis.pdf>

OECD (2016), *Big Data: bringing competition policy to the digital era*. Available at: <http://www.oecd.org/competition/big-data-bringing-competition-policy-to-the-digital-era.htm>

Osborne H. (2016), *Uber loses right to classify UK drivers as self-employed*, The Guardian, 28/10/16, <https://www.theguardian.com/technology/2016/oct/28/uber-uk-tribunal-self-employed-status>

Oskam J. and Boswijk A. (2016), *Airbnb: the future of networked hospitality businesses*. Journal of tourism futures, 2(1): 22-42.

Osterwalder A. and Pigneur Y. (2010), *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Parliamentary questions (2017a), *Question for written answer to the Commission*, Marietje Schaake, (ALDE Party), 29/03/17, <http://www.europarl.europa.eu/sides/getDoc.do?type=WQ&reference=E-2017-001673&language=EN>

Parliamentary questions (2017b), *Joint answer given by Vice-President Ansip on behalf of the Commission*, 20/07/17, <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=P-2017-001840&language=ES>

Peterson T. (2016), *How Facebook turned an end-to-end ad tech strategy on its head*, Marketing Land, 17/06/2016, <https://marketingland.com/facebook-turned-end-end-ad-tech-strategy-head-181395>

Phillips S. (2007), *A brief history of Facebook*, The Guardian, 25/07/07, <https://www.theguardian.com/technology/2007/jul/25/media.newmedia>

Picascia S., Romano A., and Teobaldi M. (2017), *The Airification of Cities: Making Sense of the Impact of Peer to Peer Short Term Letting on Urban Functions and Economy*. Conference Paper for the Annual Congress of the Association of European Schools of Planning, Lisbon, 11-14/07/17.

Primack D. (2017), *Exclusive: Inside Uber's financials*, Axios, 23/08/17, <https://www.axios.com/exclusive-uber-financials-2475912645.html>

Probst L., Monfardini E., Frideres L., Clarke S., Demetri D., Schnabel L., and Alain Kauffmann (2013), *Big Data: Analytics & Decision Making*. Business Innovation Observatory, Case study 8, European Union. Available at: http://ec.europa.eu/growth/industry/innovation/business-innovation-observatory/case-studies_en

Quattrone G., Proserpio D., Quercia D., Capra L., and Musolesi M. (2016), *Who benefits from the sharing economy of Airbnb?*. In: Proceedings of the 25th International Conference on World Wide Web, 1385-1394.

Ratliff J. D. and Rubinfeld D. L. (2014), *Is There a Market for Organic Search Engine Results and Can Their Manipulation Give Rise to Antitrust Liability?*. Journal of Competition Law and Economics 10(3): 517-541.

Rauch E. D. and Schleicher D. (2015), *Like Uber, But for Local Government Policy: the Future of Local Regulation of the "Sharing Economy"*, OHIO ST. L. J., 76: 901-963.

Regulation 2016/679 (2016), Regulation of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation -GDPR). Official Journal 119/1.

Reuters (2017), *Uber operates in more than 90 European cities, despite legal battles*, 22/09/17, <https://www.reuters.com/article/us-uber-britain-europe-factbox/factbox-uber-operates-in-more-than-90-european-cities-despite-legal-battles-idUSKCN1BX1WX>

Rhodes A. (2017), *Uber: Which countries have banned the controversial taxi app*, The Independent, 22/09/17, <http://www.independent.co.uk/travel/news-and-advice/uber-ban-countries-where-world-taxi-app-europe-taxi-us-states-china-asia-legal-a7707436.html>

Rieke A., Robinson D., Tu H., and Hoboken J. (2016), *Data Brokers in an Open Society*. Open Society Foundation. Available at: <https://www.opensocietyfoundations.org/sites/default/files/data-brokers-in-an-open-society-20161121.pdf>

Rochet J. and Tirole J. (2003), *Platform competition in two-sided markets*. Journal of the European Economic Association, 1(4): 990-1029.

Rochet J.-C. and Tirole J. (2004), *Two-sided markets: an overview*. Institut d'Économie Industrielle, Working Paper No. 258.

Rogers B. (2015), *The Social Costs of Uber*. The University of Chicago Law Review, 82 (1): 85-102.

Roof K. (2017), *Uber dealt with class action lawsuit alleging assault by drivers*, TechCrunch, 14/11/17, <https://techcrunch.com/2017/11/14/uber-dealt-with-harassment-class-action-lawsuit/>

Rosen J. (2004), *Your blog or mine?*, The New York Time Magazine, 19/12/04, <http://www.nytimes.com/2004/12/19/magazine/your-blog-or-mine.html>

Roson R. (2005), *Two-Sided Markets: A Tentative Survey*. Review of Network Economics, 4(2): 142-160.

Rotenberg M., Ngo M., and Fitzgerald C. (2007), *Complaint and Request for Injunction, Request for Investigation and for Other Relief in the matter of Google Inc. and DoubleClick Inc.*, Electronic Privacy Information Centre – EPIC, 20/04/07. Available at: https://epic.org/privacy/ftc/google/epic_complaint.pdf

Roth A. E. (1985), *Common and Conflicting Interests in Two-sided Matching Markets*. European Economic Review, 27(1): 75-96.

Rushe D. and Thielman S., *Google to restructure into new holding company called Alphabet*, The Guardian, 11/08/15, <https://www.theguardian.com/technology/2015/aug/10/google-alphabet-parent-company>

Russel J.(2016), *Confirmed: Didi buys Uber China in a bid for profit, will keep Uber brand*, TechCrunch, 01/08/16, <https://techcrunch.com/2016/08/01/didi-chuxing-confirms-it-is-buying-ubers-business-in-china/>

Rysman M. (2007), *The Empirics of Antitrust in Two-Sided Markets*. Competition Policy International, 3(1): 197-209.

Sabah D. (2016), *Turkish Finance Ministry chases Uber on tax evasion*, 30/12/16, Daily Sabah Economy, <https://www.dailysabah.com/economy/2016/12/30/turkish-finance-ministry-chases-uber-on-tax-evasion>

Saint N. (2010), *Eric Schmidt: Google's Policy Is To "Get Right Up To The Creepy Line And Not Cross It"*, Business Insider, 01/10/10, <http://www.businessinsider.com/eric-schmidt-googles-policy-is-to-get-right-up-to-the-creepy-line-and-not-cross-it-2010-10?IR=T>

Sasaki H. and Toda M. (1996), *Two-Sided Matching Problems with Externalities*. Journal of Economic Theory, 70(1): 93-108.

Savitz E. (2012), *Unwired Planet Sues Apple, Google with Infringing 10 Patents Each*, Forbes, 20/09/12, <https://www.forbes.com/sites/ericsavitz/2012/09/20/unwired-planet-sues-apple-google-with-infringing-10-patents-each/#26694c27504f>

Scheiber N. (2017), *Uber to Repay Millions to Drivers, Who Could Be Owed Far More*, The New York Times, 23/05/17, <https://www.nytimes.com/2017/05/23/business/economy/uber-drivers-tax.html>

Schepp N. and Wambach A. (2016), *On Big Data and Its Relevance for Market Power Assessment*. Journal of European Competition Law & Practice, 7(2): 120-124.

Schildkrout A. and Holt R. (2017), *180 Days of Change*, UBER Newsroom, 20/06/17, <https://www.uber.com/newsroom/180-days/>

Schildkrout A. and Holt R. (2017), *180 Days of Change: Even More Choice and Flexibility*, 22/08/17, <https://www.uber.com/newsroom/180-days-flexibility/>

Schor J. (2014), *Debating the Sharing Economy*. Essay published by the Great Transition Initiative, Tellus Institute.

Schor J. (2017). *Does the sharing economy increase inequality within the eighty percent?: findings from a qualitative study of platform providers*. Cambridge Journal of Regions, Economy and Society, 10(2): 263–279.

Scott M. (2015), *French Court that Banned UberPop Service Survived Legal Challenge*, The New York Times, 22/09/15, <https://www.nytimes.com/2015/09/23/technology/french-law-that-banned-uberpops-service-survives-legal-challenge.html>

Shields M., *Facebook Plans to Shut Down Video Ad Exchange Product LiveRail*, The Wall Street Journal, 26/05/16, <https://www.wsj.com/articles/facebook-plans-to-shut-down-video-ad-exchange-product-liverail-1464303877>

Shore J. and Steinman J. (2015), *Did You Really Agree to That? The Evolution of Facebook's Privacy Policy*. Technology Science. Available at: <https://techscience.org/a/2015081102/>

Simonite T. (2012), *What Facebook Knows*, MIT Technology Review, 13/06/12, <https://www.technologyreview.com/s/428150/what-facebook-knows/>

Symons T. and Bass T. (2017), *Me, My Data and I: The Future of the Personal Data Economy*, D 1.7 of DECODE Project. Available at: <https://decodeproject.eu/publications/me-my-data-and-ithe-future-personal-data-economy>

Slefo G. (2016), *Facebook to Serve Ads to Non-Users Through Its Audience Network*, Advertising Age, 27/05/16, <http://adage.com/article/digital/facebook-serve-ads-users-audience-network/304195/>

Somerville H. (2017), *True price of an Uber ride in question as investors assess firm's value*, Business Insider, 23/08/17, <http://www.businessinsider.com/r-true-price-of-an-uber-ride-in-question-as-investors-assess-firms-value-2017-8?IR=T>

Srnicek, N. (2016), *Platform Capitalism*. Cambridge: Polity.

Stucke M. E. and Grunes A. P. (2015), *Debunking the Myths Over Big Data and Antitrust*. CPI Antitrust Chronicle, University of Tennessee Legal Studies Research, Paper No. 276. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2612562

Stucke M. E. and Grunes A. P. (2016), *Big Data and Competition Policy*, Oxford University Press.

Superior Court of California – County of San Francisco (2016), *Doe vs. Google Inc. et al.*, Case No. CGC16556034. Available at: <http://tsi.brooklaw.edu/sites/tsi.brooklaw.edu/files/filings/doe-vs-google-inc-et-al/20161220employee-sues-google-overbroad-confidentiality-agreements.pdf>

Swedish National Board of Trade (2014), *No transfer, no trade - the Importance of Cross-Border Data Transfers for Companies Based in Sweden*. Available at: http://unctad.org/meetings/en/Contribution/dtl_ict4d2016c01_Kommerskollegium_en.pdf

Swire P. (2007), *Protecting Consumers: Privacy matters in antitrust analysis*, Center for American Progress, 19/10/07, <https://www.americanprogress.org/issues/economy/news/2007/10/19/3564/protecting-consumers-privacy-matters-in-antitrust-analysis/>

Swire P. and Lagos Y. (2013), *Why the right to data portability likely reduces consumer welfare: Antitrust and privacy critique*. Maryland Law Review, 72(2): 335–380.

Taddicken M. (2013), *The 'Privacy Paradox' in the Social Web: The Impact of Privacy Concerns, Individual Characteristics, and the Perceived Social Relevance of Different Forms of Self-Disclosure*. Journal of Computer-Mediated Communication, 19(2): 248-273.

Tassi K. (2015), *An Update On Privacy at Uber*, UBER NEWSROOM, 28/05/15, <https://www.uber.com/newsroom/an-update-on-privacy-at-uber/>

Taxi Leaks: http://leaks120.rssing.com/chan-13054183/all_p44.html

Teece D. J. (2010), *Business models, business strategy and innovation*. Long Range Planning, 43: 172-194.

Temple Lang J. and Renda A. (2009), *Treatment of Exclusionary Abuses under Article 82 of the EC Treaty – Comments on the European Commission's Guidance Paper*. Centre for European Policy Studies. Available at: <http://aei.pitt.edu/11767/1/1907-1.pdf>

Thépot F. (2012), *Market Power in Online Search and Social Networking: a Matter of Two-Sided Markets*. University College London - CLES (Centre for Law, Economics and Society), Working Paper Series, 4/2012.

The Economist, *Fuel of the future – Data is giving rise to a new economy*, 06/05/17, <http://www.economist.com/news/briefing/21721634-how-it-shaping-up-data-giving-rise-new-economy>

Thomas L. (2017), *Airbnb just closed a \$1 billion round and became profitable in 2016*, CNBC, 09/03/17, <https://www.cnbc.com/2017/03/09/airbnb-closes-1-billion-round-31-billion-valuation-profitable.html>

Thomas V. (2003), *Demand and dematerialization impacts of second-hand markets – Reuse or more use?*. *Journal of Industrial Ecology*, 7(2): 65–78.

Thompson D. (2010), *Google’s CEO: ‘The Laws Are Written by Lobbyists’*, *The Atlantic*, 01/10/10, <https://www.theatlantic.com/technology/archive/2010/10/googles-ceo-the-laws-are-written-by-lobbyists/63908/>

Thornsby J. (2017), *Is Android really just Linux? (Video)*, *Android Authority*, 13/07/17, <https://www.androidauthority.com/android-linux-784964/>

Transparency Market Research (2013), *Big Data Market - Global Scenario, Trends, Industry Analysis, Size, Share and Forecast 2012 – 2018*. Available at: <https://www.transparencymarketresearch.com/big-data-market.html>

Trebor Kalanick (2010), *Uber’s Founding*, *UBER Newsroom*, 22/12/10, <https://newsroom.uber.com/ubers-founding/>

Tsotsis A. (2012), *Uber Opens Up Platform To Non-Limo Vehicles With “Uber X,” Service Will Be 35% Less Expensive*, *TechCrunch*, 01/07/12, <https://techcrunch.com/2012/07/01/uber-opens-up-platform-to-non-limo-vehicles-with-uber-x-service-will-be-35-less-expensive/>

Turi A. N., Domingo-Ferrer J., Sanchez D., and Osmani D. (2017), *A co-utility approach to the mesh economy: the crowd-based business model*. *Review of Managerial Science*, 11(2): 411-442.

Tuzhilin A. (2006), *The lane’s gifts v. Google report*. Available at: https://googleblog.blogspot.it/pdf/Tuzhilin_Report.pdf

UK Ministry of Justice (2012), *Proposal for a EU Data Protection Regulation – Impact Assessment (IA)*. Available at: <https://consult.justice.gov.uk/digital-communications/data-protection-proposals-cfe/results/eu-data-protection-reg-impact-assessment.pdf>

United States Court of Appeals, Ninth Circuit (1998), *Rebel Oil Co. Inc. v. Atlantic Richfield Co.*, 51 F.3d 1421.

United States Court of Appeals, Tenth Circuit (2002), *Telecor Communications Inc. v. Southwestern Bell Telephone Co.*, 305 F. 3d 1124, 1132.

United States Court of Appeals, Tenth Circuit (2007), *Been v. OK Industrie Inc.*, 495 F. 3d 121.

United States Government Accountability Office - GAO (2013), *Information Resellers: Consumer Privacy Framework Needs to Reflect Changes in Technology and the*

Marketplace. Report to the Chairman, Committee on Commerce, Science, and Transportation. Available at: <http://www.gao.gov/assets/660/658151.pdf>

United States International Trade Commission (2013), *Digital Trade in the U.S. and Global Economies, Part 1*, Investigation No. 332-531. Available at: <https://www.usitc.gov/publications/332/pub4415.pdf>

United States Senate Committee Commerce, Science, and Transportation - Office of Oversight and Investigations, Majority Staff (2013), *A Review of the Data Broker Industry: Collection, Use, and Sale of Consumer Data for Marketing Purposes*. available at: http://educationnewyork.com/files/rockefeller_databroker.pdf

United States Supreme Court (1984), *NCAA v. Board of Regents*, 468 U.S. 85, No. 83-271.

Urso A. (2013), *Algoritmi di Ricerca e Limiti dell'Antitrust – Search Algorithms and the Boundaries of Antitrust Law and Economics*. *Mercato Concorrenza Regole*, 15(1): 45-82.

Van De Poel L. (2016), *Is Uber Legal In Brussels, Belgium?*, *The Culture Trip*, 28/11/16, <https://theculturetrip.com/europe/belgium/articles/is-uber-legal-in-brussels-belgium/>

Varian H. R. (2007), *Position auctions*. *International Journal of Industrial Organization*, 25(6): 1163-1178.

Varian H. R. (2006), *The economics of internet search*. *Rivista di Politica Economica* 96(6): 9-23.

Vaughan R. and Daverio R. (2016), *Assessing the size and presence of the collaborative economy in Europe*, PwC UK, <https://publications.europa.eu/en/publication-detail/-/publication/2acb7619-b544-11e7-837e-01aa75ed71a1/language-en>

Vercellone C., Bria F., Fumagalli A., Gentilucci E., Giuliani A., Griziotti G., Vattimo P. (2015), *Managing the commons in the knowledge economy*, D3.2 of D-Cent European Project, <https://www.nesta.org.uk/sites/default/files/d-cent-managing-the-commons-in-the-knowledge-economy.pdf>

Vercellone C., Giuliani A., Brancaccio F. & Vattimo P. (2017), *Il Comune come modo di produzione. Per una critica dell'economia politica dei beni comuni*, Verona: ombre corte.

Vercellone C., Monnier J-M., Lucarelli S., Griziotti G., 2014, *Theoretical framework on future knowledge-based economy*, D3.1 of D-Cent European Project, https://dcentproject.eu/wp-content/uploads/2014/04/D3.1-final_new.pdf

Vijayan J. (2013), *What Google's Transparency Report doesn't tell us*, *Computer World*, 25/01/13, <https://www.computerworld.com/article/2494704/data-privacy/what-google-s-transparency-report-doesn-t-tell-us.html>

Visco Comandini V. (2013), *Google e i mercati dei servizi di ricerca su Internet*. *Mercato Concorrenza Regole*, 15(3): 541-569.

Vise D. and Malseed M. (2006), *The Google story: inside the hottest business, media and technology success of our time*. Summaries.com. Available at: <http://qcseminars.com/files/2011/01/thegooglestory.pdf>

Vitari C. and Raguseo E. (2016), *Digital data, dynamic capability and financial performance: an empirical investigation In the era of Big Data*. In: *Systèmes d'Information et Management*, 21(3): 63-92.

Vogelsang M. (2010), *Dynamics of Two-Sided Internet Markets*. *International Economics and Economic Policy*, 7(1): 129-145.

Wagner J. (2016), *Clinton's data-driven campaign relied heavily on an algorithm named Ada. What didn't she see?*, *The Washington Post*, 09/11/16
https://www.washingtonpost.com/news/post-politics/wp/2016/11/09/clintons-data-driven-campaign-relied-heavily-on-an-algorithm-named-ada-what-didnt-she-see/?utm_term=.c2b8f1ddc3ff

Walker K. (2016), *Android: Choice at every turn, Google in Europe*, 10/11/16. Available at: <https://www.blog.google/topics/google-europe/android-choice-competition-response-europe/>

Williams-Grut O. (2015), *EXCLUSIVE: Uber's rival says it uses 'tax avoidance on an industrial scale,' and wants Europe to investigate*, *Business Insider*, 31/07/15,
<http://www.businessinsider.fr/uk/uber-tax-in-europe-2015-7/>

Wolf C. and Maxwell W. (2012), *So Close, Yet So Far Apart: The EU and U.S. Visions of a New Privacy Framework*. *Antitrust*, 26(3): 8-13.

Wortham J. (2011), *Matching Travelers With Rooms, via the Web*, *The New York Times*, 25/07/11, <http://www.nytimes.com/2011/07/25/technology/matching-travelers-with-rooms-via-the-web.html>

Yan S. (2013), *Spain fines Google for breaking data law*, *CNN tech*, 20/12/13,
<http://money.cnn.com/2013/12/20/technology/google-spain-fine/index.html>

Yang Lynn J. (2009), *Obama & Google (a love story)*, *Fortune*, 26/10/09,
http://archive.fortune.com/2009/10/21/technology/obama_google.fortune/index.htm

Yannopoulos N., Moufahim M., and Bian X. (2013), *User-generated brands and social media: Couchsurfing and Airbnb*. *Contemporary Management Research*, 9(1): 85.

Yu J.C., Kuo L.H., Chen L.M., Yang H.J., Yang H.H., and Hu W.C. (2009). *Assessing and managing mobile technostress*. *WSEAS Transactions on Communication*, 4 (8): 416-425.

Zervas G., Proserpio D., and Byers J. W. (2014), *The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry*. *Journal of Marketing Research*, 54(5): 687-705.