LUISS Guido Carli
LIBERA UNIVERSITA' INTERNAZIONALE DEGLI STUDI SOCIALI

Department of Economics and Finance

Chair of Law and Economics

THE EUROPEAN ANTITRUST INVESTIGATION AGAINST GOOGLE AND THE END OF NEUTRALITY IN THE INTERNET ECOSYSTEM

SUPERVISOR
PROFESSOR
ANDREA RENDA

CANDIDATE
EDOARDO GRILLO
ID N. 170801

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ABSTRACT

The way the Internet is used and known today is different from how it was in the past during the ARPANET phase, and for sure it will be different in the future. The main aspect that has changed since ARPANET is the evolution of the classical 5 Layer Protocol Stack into an Hourglass model, with the waist that is going through poor radical innovations, and the sides that are being improved and revolutionized continuously. The traditional way in which data used to flow in the Internet structure, meaning from content providers through International backbones and then transmitted to Access ISPs, which in turn delivered it to final users, has changed with the development of CDNs (Content Delivery Networks). Now-days, with delivery networks, content providers can now bypass the network and directly reach users, thus affecting the behaviour of ISPs and the possibilities of new net neutrality. Furthermore, the direction in which the Internet is evolving poses worries also on other future types of neutrality problems, ranging from search neutrality problems, to cloud neutrality, application neutrality up to platform neutrality issues. In this way, the Google investigation can be seen as the latest antitrust problem faced by regulators.

Google has been accused of giving priority to its own specialized search services over other competitors, for using third party original content without sharing its revenues, and without receiving permission to take it, obligating advertisers to use only its AdWords platform and not competing ones, as well as imposing on third party websites to use only its own advertising channels and not other ones with the risk to lower the publisher PageRank. The legally binding implementations, for which the European Commission came up with, seem not to substantially increase consumer wealth, but rather pose threats to future investments over other firms like Google. Moreover, the conditions for Google to be accused of anticompetitive conducts are not met.

In conclusion, although Google has been investigated by the European Commission for abusing of its market power in the search practices; there is no better example of how competition is evolving. Since CDNs (both of big content providers and/or of ISPs) are not investigated for net neutrality issues, like instead ISPs are when discriminating and giving preferential pipes to content providers when paying more, the future scenario could be characterized by big conglomerates of content providers, which will use preferential pipes offered by CDNs mainly, to deliver a better Quality of User Experience and force smaller content providers to exit the market. From this prospective, regulators will face increasingly complex issues in the following years, which will need to be fully understood in order to avoid errors, and evolve the regulatory framework into a more flexible tool, since neutrality problems will be more interconnected among markets (and niches) and between layers.

Article I. INTRODUCTION

The evolution of the Internet is changing the way people interact with each other and with objects, with higher expectations from companies to satisfy their increasing needs. However, this evolution is becoming a problem for antitrust regulators that are facing increasingly complex and fast moving markets with a higher possibility to make errors that could do worse than better. Furthermore, regulators in the future will face increasing types of neutrality problems, due to the complex way in which the Internet is evolving, leading to few big companies that will heavily innovate and other smaller ones that will fight to stay in the market. As it can be seen, nearly a decade ago began the problem of net neutrality and a tenacious fight with Internet Service providers, which is still far from being solved. Instead, 5 years ago emerged the problem of search neutrality and of search engines that are evolving into more complete and broader information intermediary, dealing not just with queries but also with actual and associated needs of users. In this sense, the investigation that has been done by the European Commission for antitrust regulation against Google Inc. can be seen as the first of several future problems of abuse of market power in a fast-growing market with high levels of innovation and technological progress that mainly concerns the delivery and intermediation of information to and from users. In this paper will be discussed and analysed the interactions of Network Neutrality and Search Neutrality problems with the evolution of the Internet Structure. Furthermore, will be also analysed and discussed the Search Engine environment and the Google case at the European Commission in relation to the way people now access the World Wide Web and interact among them. Moreover, the Google case will serve also as an example of how big firms operating in the Internet ecosystem will evolve in the future with respect to changes in the architecture of the Internet and of data flow. Ultimately, it will be discussed ways in which

antitrust regulations can deal with increasingly difficult antitrust assessments. The second section will analyse the way in which the Internet ecosystem is evolving as a background for the explanation of the Net Neutrality problem. Consequently, in the third section will be analysed the problem of search neutrality as a new problem for regulators to deal with, while in the fourth section it will be described the way the search engine environment is made and the forces that shape it. In the fifth section of the paper will be examined Google Inc. and the way it influences the search engine environment and its competitors, while the sixth section will show how European antitrust regulations affect Google and the other horizontal and vertical search engines. The seventh section will explain the European investigation and the final decision on the Google's conduct, while the eighth section will discuss the implications and consequences of the European Commission's decisions. The last section of the paper will deal with a conclusion of how the evolution of the Internet can be linked to net neutrality and search neutrality problems and how the Google case can help foresee the future evolution of the Internet ecosystem and its competitive landscape.

Article II. THE INTERNET ECOSYSTEM

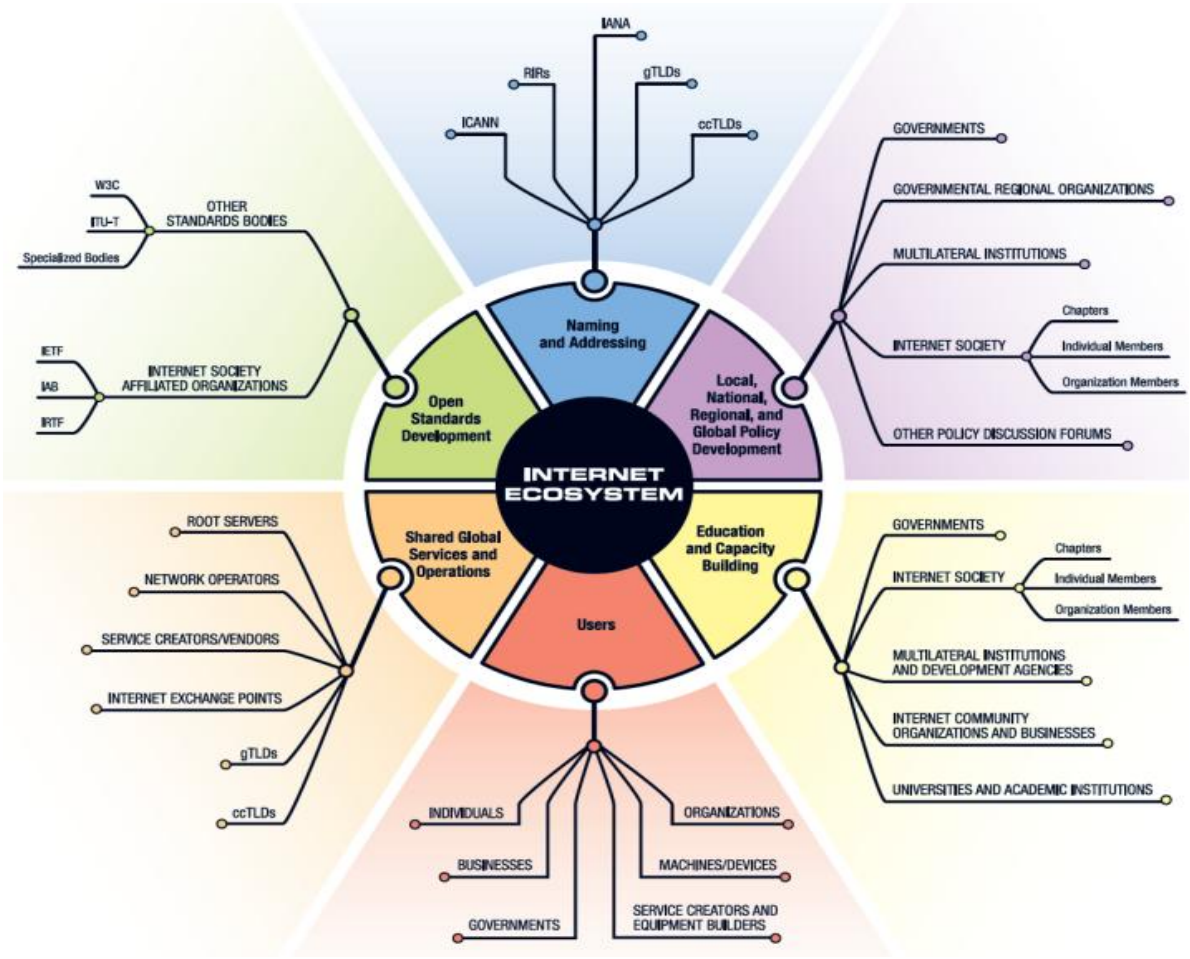
Section 2.01 The Evolution Of The Internet Structure

Internet as it is known today is a multi firm industry platform constructed by multiple firms interconnecting their networked assets on open standards. A platform is a technology that provides different services on top of which different products can be developed and deployed. Actually, the Global Internet and its ecosystem are many layers of platforms that are developed one over the other (Clark, 2013). Furthermore, the global Internet can also be considered a multi-sided platform (MSP), which is a special case of a multisided market, where users are one class of participants and complements are the other class which gives services to users; with the main implication that complements would not operate on this platform if there are no users, and vice versa.

The web is also a multi-firm platform that operates one layer above the Internet transport capability, and applications that use the web platform serve themselves as platforms for other products or services. Essentially, the Internet ecosystem is made out of many layers that serve as a platform for the layers above, ranging from the physical layer up to the application layer. Thus, these repeating layers built one on top of the other can multiplex so can simultaneously support a large variety of higher-level services.

The term ecosystem used to describe all the Internet parts refers to the combination of physical and biological components of an environment. It describes all the hardware, software, players that operate in it and constitutes it, together with the complex set of rules and relations that affect them. Thus, the Internet ecosystem is made of physical architecture and the cyberspace.

Figure 1



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The models, also called protocol stacks, which have represented the Internet ecosystem layered structure during the years, have gone through several changes. From the two layer stacks of ARPANET (Advanced Research Projects Agency Network) to the four-layer stack reaching the modern TCP/IP reference model. Besides this model it is possible to find two other models that help to understand what works and what doesn't work in the layer structure model: the OSI-model and the DOD 3 layer mode.

[1] Image 1 taken from (Internetsociety.com, 2014)

Figure 2

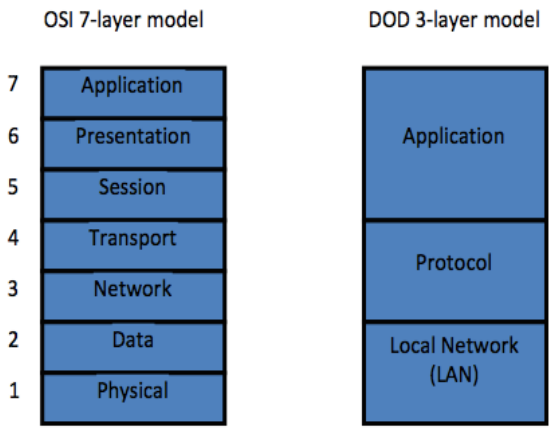


Figure 3

Figure 8: The Modern TCP/IP Reference Model[161]

Layer	Location	Protocols
Application	Process-to-process	SMTP (email), HTTP (web), FTP (file transfer), Telnet (remote login)
Transport	Host-to-Host	TCP (reliable); UDP (unreliable)
Network	Router-to-router	Internet Protocol
Datalink	Switch-to-switch	Ethernet, connection oriented (X.25, ATM, Frame Relay), wireless (802.11, Bluetooth)
Physical	Within network	Twisted pair (telephone), coaxial cable, fiber optics, spectrum

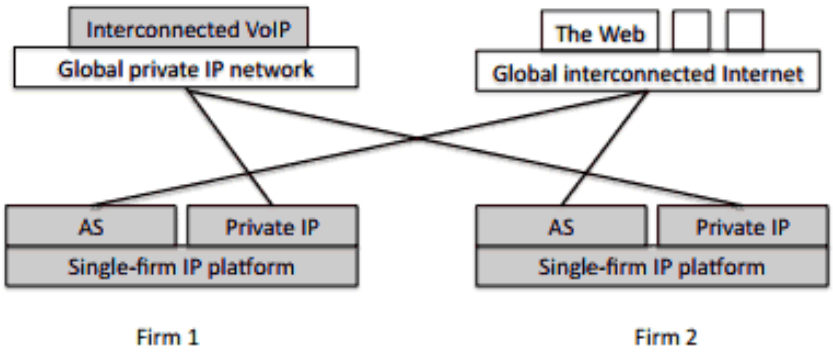
[2]

During the years these layers, which characterize the Internet structure since the first days of ARPANET, have gone through innovation processes that have increased the performance and quality of the overall system. The effects of these innovations can be seen in the ease of use and features that the Internet ecosystem today has compared with the past. Each layer is interconnected with the layer below and above, but changes in each layer are independent from other layers, permitting to modify one layer without changing the other ones. In one hand, technical details change rapidly over time, especially in the physical layer and in the application layer. On the other hand, this layer model finds in the Global Internet layer (Transport Layer) and in the IP layer

[2] Image 2 taken from (Me, 2013) , image 3 taken from (Yoo C. S., 2013)

(Network Layer) two durable layers, which have been stable and persistent over time. Another stable layer that is becoming, and will be in the future even more used, is the IP layer as a multi-firm platform instead of being only a single-firm platform. This evolution is based on interconnecting and building a multisided platform out of the single firm IP platform of each ISP. So instead of having a converged service layer based on Internet Protocol (IP), over which infrastructure owner (ISP) can offer its own services, there will be a large content delivery networks (CDNs), which facilitate the efficient delivery of content, that will give a service to content providers, and that can be considered: firstly complements of ISP platforms to which they connect to, secondly, will operate at a layer above the Global Internet layer and lastly, will interconnect with several other ISPs acting as a delivery enhancement mechanism for various higher level services.

Figure 4

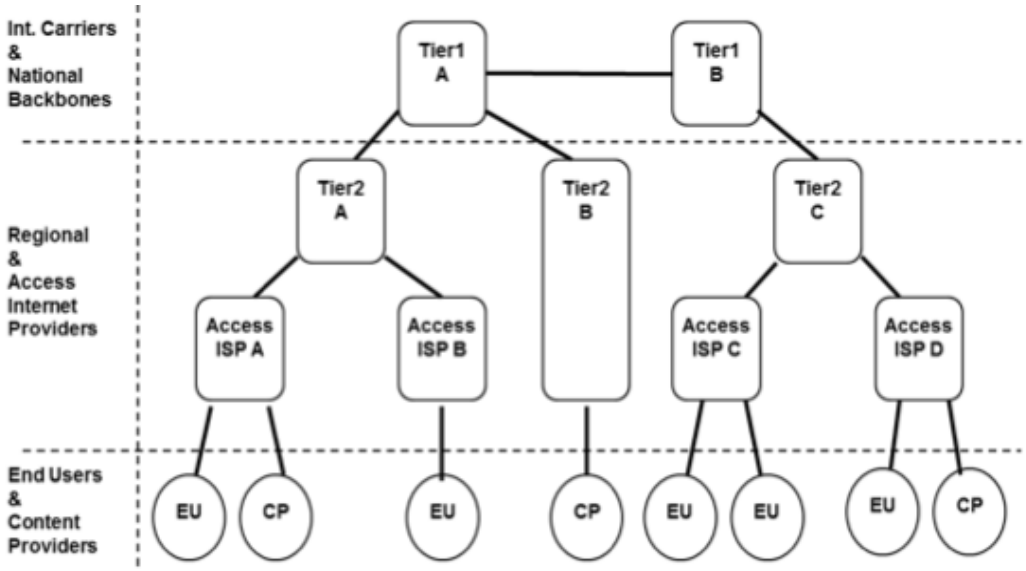


(b) *Both the global Internet and a multi-firm internal IP network built by interconnecting the platforms of multiple firms.* [3]

However, the way the data flows with CDNs changes completely with respect to how it used to flow before their appearance. The traditional way in which content was delivered to end users from ICPs was through a hierarchical architecture, with national backbones that distributed downwards to the Regional and Access ISPs data, which in turn was delivered to end users.

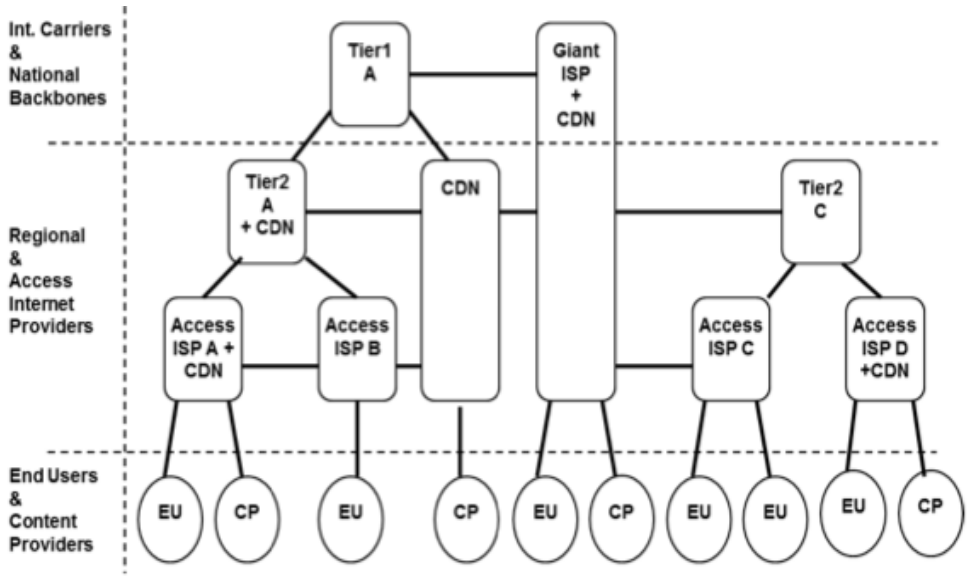
[3] Image taken from (Yoo C. S., 2013)

Figure 5



Instead, with CDNs the Internet architecture has evolved towards a more interconnected model, since they move servers from which users download the content needed closer to them, avoiding Regional and Access ISPs.

Figure 6



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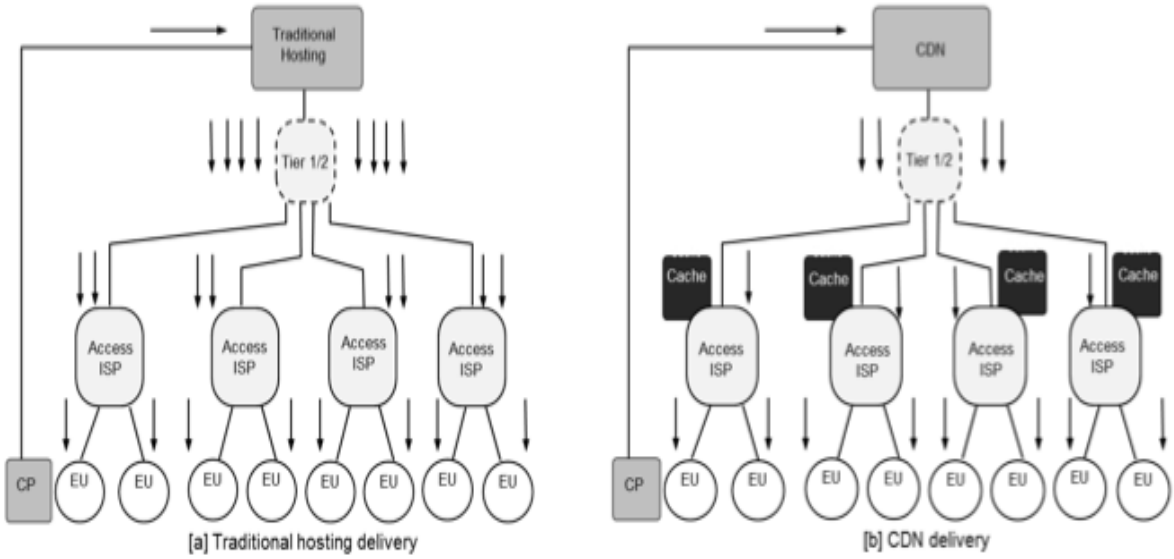
[4] Images 5 and 6 taken from (MANUEL PALACIN, 2013)

In this way, there is a more direct and faster connection with users, also due to the fact that CDNs use cache servers close to end users in order to avoid resending data at every end-user's request through all the network by just caching content close to final users, and send a cache copy without touching the whole network. Thus, instead of transmitting a data stream for each user's request, like it would happen in the traditional data delivery without CDNs (scheme a), the data is transmitted by ICPs to CDNs that then transmit it to the cache servers, which later handle the user requests (scheme b).

Figure 7



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Furthermore, it has been shown that big ICPs tend to use CNDs (either their own or external ones) in other to deliver an improved Quality of User Experience, while low visited websites, tend to use the traditional hosting solutions that are far more cheaper, but which also deliver a lower Quality of User Experience compared to big ICPs. An interesting feature is that backbone ISPs with the appearance of CDNs, began to operate in a two-sided market: on the one hand they offer transfer services to Access ISPs, some of them that

[5] Image 7 taken from (MANUEL PALACIN, 2013)

now also have backbones, which compete at the same time in transit and CDN businesses; and on the other hand, they operate with their own networks by offering CDN services to large ICPs (MANUEL PALACIN, 2013).

Returning to the way Internet layers are being innovated, revolutions in one layer, since it is not need that also other layers are changed, permits to have a better operability with the other layers by speeding up communications between applications and platforms and increasing the quality of connection among them.

In fact, during the years the layers at the extremes have been innovated heavily, while the layers at the core instead have staid the same: the physical layer and Data-link layer have gone through massive changes that have increased the speed of connectivity and the stability of the connections. Fibre optic and coaxial cables in the physical layer, which has the function to move individual bits between nodes, Wi-Fi connections and LTE in the data-link layer, which has the responsibility with its protocols to guide traffic through the network, have now made the transfer of data more efficient and smooth. Besides, at the application layer, protocols have changed over time with newer ones that have been introduced to support newer classes of software and services.

On the other hand, the two core layers, network layer and transport layer have mainly staid the same. At the network layer, which can be considered an upper boundary for services provided by switches and routers, Internet Protocol (IP) has been from ARPANET the base for communication between networks. So far IP has reached version 6, which has begun to be adopted from 2010, when the IPv4 addresses have been completely taken. The newer version, IPv6, differs from its predecessor for having more length of the address changing from 32 bits to 128 bits, for providing both a stateful and a stateless address configuration functionality, for having a different and more simplistic packet

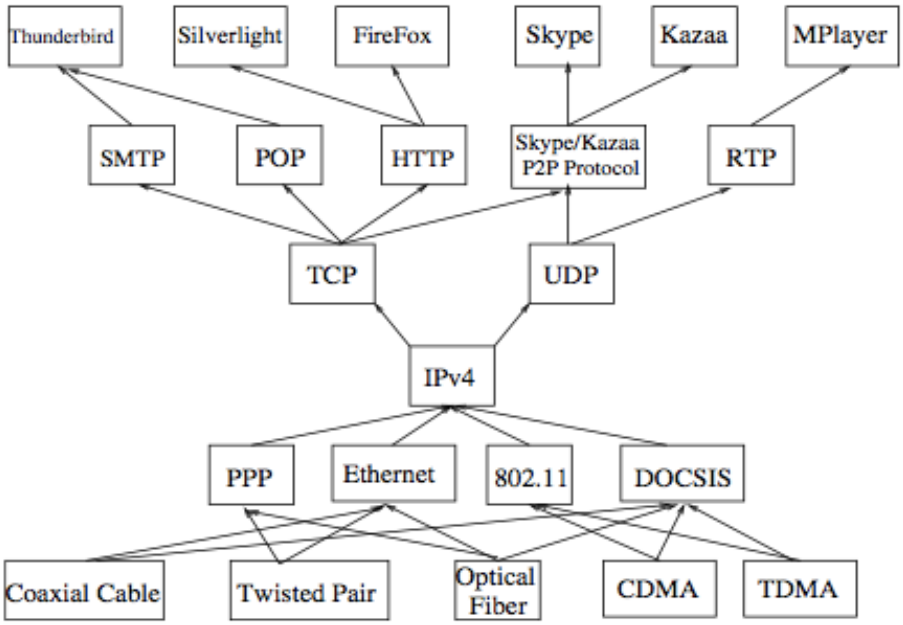
header and the Multicast function, which enables sending a single packet, but still interconnect with more than one system on the network.

At the transport layer instead, since ARPANET, Transfer Control Protocol (TCP) has stayed the same, controlling the transfer of data between hosts and directing it to the appropriate processes running on the host. Another protocol that stayed the same since ARPANET and that has been used more and more often during the years is the User Datagram Protocol (UDP), which is an alternative to TCP as being more efficient for applications that are more sensitive to latency. The main difference between the two protocols, which explains why UDP has been used as a protocol for types of application like P2P or VoIP that can tolerate latency or data loss, is that UDP starts sending data immediately without waiting a response from the other host or any acknowledgment from it, like instead is needed from TCP to begin a transmission. This means that if any part of the stream of segments of data is dropped the transmission continuous, which may result in a lower quality of the service or small interruptions, but not the complete break of the whole transmission like for TCP. In fact, TCP protocol needs to have an answer from the host in order to start sending the data packet, so in this sense, UDP is unable to guarantee a reliable delivery of streams of data between hosts.

Furthermore, what is happening in the last years is a process of combination of the network layer with the transport layer into a single layer. This combination would result in a four-layer model that would not consider the fundamental function of the network layer as the basis for universal connectivity and consider that the two layers were separated in the past in order to support real-time applications, such as packet voice. Moreover, the two layers interact with different types of peers: the transport layer runs in the hosts, while the network layer is the upper boundary for services provided by switches and routers. The combination of these two layers would go against the central function of layering, which limits interaction among entities only with their peers.

All being said, the protocol layer model seems to be evolving to an hourglass-form model, with the sides that keep on being innovated continuously, while the waist remains ossified. In fact, since ARPANET, the outer layers have gone through massive innovation processes while the two layers in the middle, network layer and transport layer, have stayed mostly the same expect for several small fixes. This type of model has been based on the implication that the two central-waist layers should be kept as simple and uniform as possible, while the other layers can evolve freely also in more complex forms with network management practices.

Figure 8



[6]

[6] Image 8 taken from (Saamer Akhshabi, 2011)

Section 2.02 The Evolution Of The Web And The "Internet Of Things"

The Internet revolution quickly transformed communications and the access to information into a fundamental part of businesses and everyday life. Yet, as widespread as it is, the Internet is still changing and is now entering a new stage of advancement that is going to make it more conscious, smart and available.

Today's information services base was set with web 1.0, which was a read-only type of web. With the web 2.0, also called the read-write web or the "social web", the Internet has been made easier for users to comprehend, operate and be part of the ecosystem by creating and publishing content. Web 2.0 has really become an important part of people's life and businesses, with users that could share their ideas with the rest of the "world" through blogs, wikis, social networks and businesses that could sell directly through the web their products and services, giving them the possibility to develop newer and more efficient business models for both inward and outward-facing needs.

Instead, the web 3.0 can be seen as an evolution of the web 2.0 into a more "intelligent web", addressing the lack of structure and organization of its predecessor by connecting information from dissimilar source and systems to make the web easier, more effective and appreciated by users. Furthermore, the web 3.0 is also called the "semantic web", because it will use semantics to understand searchers' queries and then provide suitable and pertinent content to end-users. Actually, the web 3.0 is already taking place, even though still in a limited form, in some websites like TipTop Search, which uses semantic technologies to look for twitter messages and categorize results, based on users' feelings and experiences linked to the topic that is being searched. Moreover, Microsoft's search engine (Bing) uses semantic technologies to propose related bogs, tweets and supplementary related queries that a user

may consider when searching for information. Essentially, the web 3.0 stresses three main aspects:

- The ability to obtain context-related information from a web search
- The capability of obtaining information from a range of previously conflicting sources
- The ability to include all kinds of devices in the data creation, use and communication process.

Moreover, the environment in which the web 3.0 needs to develop is built on three fundamental technology-based services:

- Cloud-based services, helping in accessing and analysing procedures performed in order to provide context-aware, smart information services and results,
- User-generated content and social medias, continuing to create new data and adding value to others,
- Shift to IPv6, the next-generation Internet protocol that will provide both the addressing schemes and a shared IP-based platform, which will accelerate connectivity among devices and components in order to build the "Internet of things."

IPv6, together with linked data, semantic technology and the openness of formerly mismatched data and applications, will make simpler the merging of data, applications, systems, and communications needed in order to build the Web 3.0 (Verizon).

Similarly, as the context that will permit the web 3.0 to be built is evolving, also the Internet environment is changing its structure and functions. In fact, what is occurring during these years, is an evolution of the Internet from "the Internet of people", which has permitted people from all over the world to

interact through the Internet, to the “Internet of things (IoT)”. The IoT will make it possible for objects to communicate and interact with other objects and to have access to comparative information. Actually, the IoT denotes the subsequent evolution of the actual Internet, increasing its ability to collect, analyse and allocate data that users can then transform into information and knowledge. Taking a closer look and analysing the evolution of the web versus the evolution of the Internet it is possible to observe several distinct stages:

1. The first stage can be called the “Research Phase”, where the web was called ARPANET and was mainly used by universities for research purposes.
2. The second stage of the web is also known as “brochure-ware”, denominated by the domain name “gold rush”. This stage was concerned with the need that any company had to share information about their products on the Internet in order for people to know them better.
3. The third evolution, known also as the “dot-com” boost, changed the web from its static data form to transactional information, with products and services that could be purchased, sold and delivered more easily. Firms like Amazon and EBay found its way to success and have become leaders in their markets.
4. The fourth stage, the one where the Internet is now, defines the “social” or “experience” web, in which companies like Facebook, and Groupon have become enormously famous and profitable by allowing people to interconnect, share experiences and information about them with their social sphere and peer groups.

By comparison, the Internet has gone through a steady evolution and development, as it can be seen also from the development of its layered structure, and actually hasn’t changed much. Essentially, performs the same

actions and processes that also ARPANET did, even if more fluently and easily, and is based mostly on the same principles, standards and protocols.

In this sense, IoT gains huge importance since is the first radical evolution of the Internet, which will lead to ground-breaking uses with the potential to drastically improve the way people learn, work, live, and get entertained. Actually, the IoT has introduced in the actual Internet sensory types of devices (temperature, pressure, moisture, etc.), allowing people to be more proactive and less responsive.

Furthermore, as it is already observable, different types of products are presiding the IoT, like Google Glasses, which bring most of the features of a smartphone and a pc at an eye glimpse, and more importantly can communicate and control other objects, or Nest (acquired by Google one year ago), which can control the house temperature and regulate it and can be controlled by mobile devices.

Similarly, as it is for web 3.0, also the IoT needs the adoption of IPv6 as the new Internet Protocol, since it makes the organization of networks simpler because of auto-configuration capabilities and improved security features. Moreover, technology will need to develop newer types of devices that can be auto-sustainable without the need to be recharged or to change batteries. Lastly, newer standards will need to be released in order for IPv6 packets to be easily routed across different network types (Evans, 2011)

Section 2.03 Net Neutrality And The New Phase Of The Debate

Exactly in the evolution of the Internet layer model into an hourglass shape, with the waist to be kept dumb, while the other layers can evolve and be

managed differently, is to be found the problem of net neutrality and the debate that has arisen from it since the Madison case. The Madison case has been the first and only case where a DSL named Madison River, which decided to block the network access point to other competing VoIP providers, has been found guilty and had to a pay a fine of $15000. What happened after this case ended was a debate on the level of neutrality the network needed to have and whether data discrimination had to be done in a small part or if instead all data had to be treated equally. The Federal Commission Communication (FCC) states in its Open Internet Report and Order that the network needs to have:

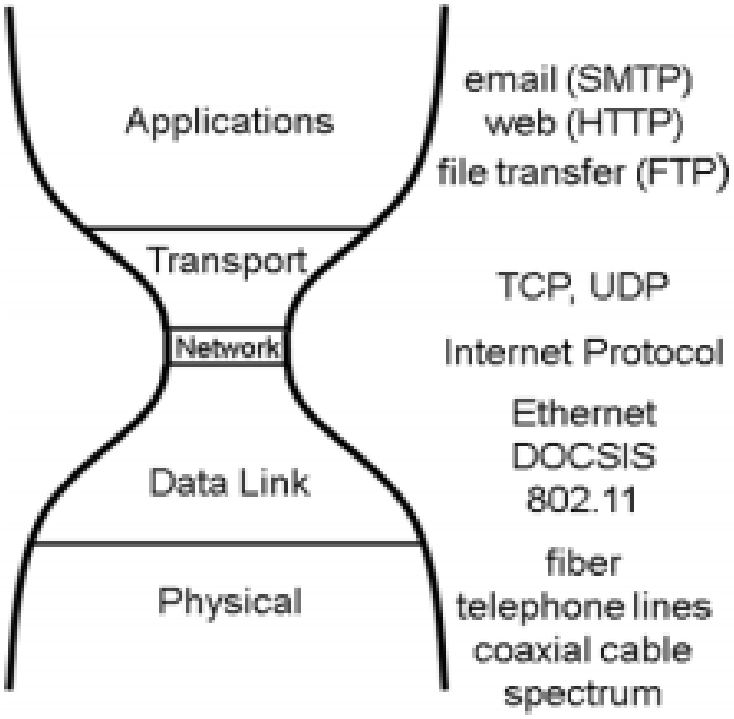
i. "Transparency. Fixed and mobile broadband providers must disclose the network management practices, performance characteristics, and terms and conditions of their broadband services;
ii. No blocking. Fixed broadband providers may not block lawful content, applications, services, or non-harmful devices; mobile broadband providers may not block lawful websites, or block applications that compete with their voice or video telephony services; and
iii. No unreasonable discrimination. Fixed broadband providers may not unreasonably discriminate in transmitting lawful network traffic" (Commission, 2010)

The ones favourable for openness of the Internet, which they define as a network of "dumb pipes", where intelligence is placed at the edges with no possibility of discrimination of data can be made, claimed that net neutrality had to be mandatory by clear regulatory requirements, arguing that ISPs could have strong incentives to change the Internet where not all bits are treated equally and data flow can be managed at their best interests. Furthermore, the net neutrality advocates argue that preferential lanes for faster Internet connections, that are now priced higher by ISPs, should be considered as the normal service offered to everybody, hence ISPs should always give their

"best-effort" services without making discrimination or charging higher prices. On the other hand, ISPs claimed that some small degree of data flow management should be present in order to have a good functioning of networks, meaning that their role should also be of "Gatekeepers" of the Internet ecosystem.

Actually, it is very easy to see that IAPs and ICPs have no alternatives, but to use an ISP to supply their products to consumers. This obviously puts ISPs in a favourable position since, operating at the physical layer, can block and discriminate data flow and content by using the network and transport layers, like altering the TCP/IP Protocol

Figure 9



[7]

[7] Image 9 taken from (Yoo C. S., 2013)

What actually is happening today is that ISPs are discriminating with respect to Internet Complements, by applying:

- Some rough discrimination behaviour through volume level strategies that favour large, established complements to new entrants.
- Discrimination using Deep Pocket Inspection (DPI) to prioritize traffic or to block a certain class of applications
- Traffic accelerators at the application layer (caching services)
- Blocking Applications, like VoIP and P2P traffic
- Discriminatory terms for physical interconnections to complements' networks

Actually, it has been shown that allowing ISPs to offer at a higher price a better Quality of Services (QoS) to complements is welfare-enhancing (Marc Bourreau, 2012). Additionally, it came out that it is beneficial to allow ISPs to charge content providers for superior QoS (Sidak, 2007).

Furthermore, today ISPs do discriminate with respect to what consumers can do when they are attached to the Internet. Actually ISPs impose a soft form of discrimination, or consumer tiering, by charging different price offers with respect to usage or Internet speed, with the low users that end up supporting high usage users, or with the "normal" speed users that are given lower quality connection with respect to the high speed ones. Moreover, it seems that the four rules stated in the FCC Open Internet Report are made in this way in order to intentionally allow ISPs to stratify their users into different segments (Clark, 2013). Furthermore, ISPs can discriminate by giving higher speed bandwidth and QoS to ICPs or IAPs that are willing to pay more. This process, also known as Access-Tiering, certainly degrades the quality of non-prioritized traffic or permits preferential agreements with specific content providers that would put them in a more favourable position with respect to other ICPs.

The debate is now facing four different dimensions:

- "A technical dimension, that is related to the problem of network congestion and traffic shaping
- A competitive dimension, which links neutrality to competition at the various layers of ISP platforms, and examines incentives of different players as dependant on the degree of competitive pressure they face
- A consumerist dimension, focused on the impact of net neutrality on consumer access to content on the Internet,
- A dynamic efficiency dimension, which links net neutrality to incentives to invest in Next Generation Networks (NGNs)." (Renda, 2008)

Although the Internet structure still heavily influences the debate, in the meanwhile different trends are remodelling the Internet access structure, and can create strong bottlenecks in solving the net neutrality debate:

- The growth of the Mobile Broadband as the main access to the Internet, outperforming all the other ways of access. With the development of LTE connections, especially in the USA, with aggressive competition by the broadband providers, raises the problem of network neutrality requiring intervention of regulators (Ohlhausen, 2013).
- Backbone facilities and regional networks have established additional interconnection points, engaging in secondary peering and multi-homing, routing their traffic directly to another regional network, thus avoiding the national backbone. Thanks to these interactions, the use of the Internet is made more efficient and concerns over the intensity of market power on termination monopolies are mitigated (Yoo C. , 2010)
- Due to development of network technologies, ICP are exercising greater control over delivery, both at long-distance and at the last mile parts. ICP are using CDN to deliver consumer queries to their nearest spots, by reducing the use of long-distance networks, which permits

content providers to save money and possible blockages. Moreover, large content providers like Google are renting server space and creating relations with private networks in other to reduce the use of the backbone and save on costs. Furthermore, for example Google has brought on a very aggressive strategy by beginning to build a global delivery network, reaching in 2009 almost 6% of global Internet traffic carried out (OECD data), and is now developing its last mile provision with Google Fiber offering access speeds up to 1 gigabyte upload (Woodcock, 2012). The vertical expansion of content providers has incentivized backbone network providers and ISPs to offer new local CDNs access in order to keep up with competition (Wright, 2012).

Currently, the Net Neutrality case and the battle for the Open Internet has entered a new phase after the decision, in January 2014 by the Federal Court, to limit the enforcement of the FCC's policy of net neutrality, therefore blocking or "unreasonably discriminating" Web content, with Verizon that has successfully challenged the regulations that were at the base of net neutrality arguing that these rules had exceeded the FCC legal power. However, the Court also claimed that the FCC had power to supervise the Internet in order to encourage competition. Again, the debate is facing two opponent sides:

- Technology companies on one side, together with providers of applications (IAPs) or content (ICPs), tend to favour net neutrality because it avoids ISPs from giving preferential service to certain websites, regardless of the size or the amount of bandwidth used.
- Internet Service Providers (ISPs), on the other side that have spent billions of dollars improving their infrastructure and claim that they should have the possibility to freely manage their network, with a certain degree of Gatekeeping.

The problem in the meanwhile is that ISPs could start again discriminating and blocking access to certain websites and content, like it happened in the past with AT&T and Verizon that blocked access to Google Wallet app, which was a direct competitor of their finance app. One possibility, unfavourable for ISPs, is that the FCC moves the ISPs in the same legal category of telephone providers, which are heavily regulated, restricting significantly their actions. The FCC now needs to craft new net neutrality regulations that will protect competition and against data discrimination, and is currently gaining information from companies and public opinion before creating a new set of rules.

All being said, Net neutrality is not a status to go back to; but a position to be created in order to permit sound competition. The debate is far from being over, especially with the European Commission that considers desirable product differentiation through traffic prioritisation and network management, because it creates new opportunities for ICPs and increases the choices given to consumers. In this prospect, it is questionable, since ISPs should be subject to net neutrality in not discriminating bits and content, if also search engines should be subject to search neutrality. Emphasis on Net Neutrality implies that the only problem of discrimination of data can be made by ISPs as gatekeepers of the Internet. The majority of net neutrality supporting arguments is based on the false belief that market power and discrimination in the Internet environment can occur only by players at the physical layer. Yet, the Internet is evolving in a way that the possibility of exercising market power can also arise at higher layers generating not only a problem of net neutrality but also of search neutrality, application neutrality and cloud neutrality, reaching at the end a platform neutrality debate.

Article III. SEARCH NEUTRALITY

The concept of search neutrality has been gaining huge momentum especially in the latest years with the “Google Case”. From the Microsoft case, which introduced the problem of net neutrality, over time, the Internet has started to face other types of “Neutrality” problems. Search neutrality, which still is not generally considered an official principle to follow in antitrust regulations, refers to the behaviour of a search engine to not favour its own content in its search results except if its content is empirically better than other competing search results; with the implication that both the search engine own content and other competing content are based on a neutral search algorithm which doesn’t make discrimination and provides rankings of results based on an objective metric of relevance.

Important to notice when speaking of the neutrality of the results of a search engine is to which degree a search algorithm is neutral and who would assess its neutrality. Clearly, the search algorithm’s rankings are based on the search engine’s judgment of value and relevance of the web content that is being given as a result of a search query: PageRank, Google’s algorithm for example, takes in account more than 200 weighted factors which are revised every year more than 500 times. Hence, it is very difficult to determine the neutrality of an algorithm, due to its complex structure that requires regulators with expertise and skills to understand it and monitor changes over time, and because it should be introduced a normative standard against which the neutrality of a search engine can be measured. Furthermore, it is very difficult to analyse the search neutrality principle at this moment in time with the idea that search engines have not evolved from the classic role of “just” providing blue links, in order to connect users to information sources, to actually proving information themselves. In the previous years, search engines like Yahoo!, Google, Bing and others, have begun to vertically integrate, providing more

than just ten blue links per page, but also offering, as discussed above with Google, more reach results and query-solving information.

In fact, in the past, search engines used mathematical algorithms to respond to users' queries with ten blue links (ten URLS) per page that would connect users to web pages, which were the sole providers of information (Lao, 2013). As the market evolved, search engines have begun to vertically integrate and display a part from the classic blue links, also richer results from their own websites. Hence, a problem of manipulation of search results could arise, with search engines that would give a better ranking and position to their sites with respect to other vertical competitors. As seen above, the higher the position of a result on a search engine page, the greater the number of clicks by users. However, D.A. Crane argues that even dominant search engines, like Google, account for a reasonably small part of traffic origin. Crane continues by showing that even if a dominant search engine is primarily used to reach a search vehicle, it is not granted its dominance when it comes to reaching a particular. For example, after 2011, websites like Expedia, Yahoo! Travel or Bing Travel complained of possible abuse of the dominant position by Google after the acquisition of the travel search company ITA: actually according to Complete Inc. data, only 12% of ingoing traffic in Expedia, 7% in Yahoo! Travel and 4% in Bing Travel, directly came from Google. Furthermore, it has been shown that even though Google has a very big market share, only 41% of search origin to websites comes from it. Clearly, it is very questionable the attribute of dominance that has been given to Google over the years since Internet information sectors are constantly changing, with monopoly power that is difficult to reckon only from a search engine's market share since users can rapidly switch to another search engine very easily, and with competition from other players like Facebook, Amazon, Microsoft (Bing) that is very intense (Crane, 2012).

Instead, Search neutrality should be analysed from the point of view that search engines are not delivering anymore just transitional information, hence retrieval of information, but also ultimate information by directly answering to queries. In fact, people have changed their preferences as Prabhakar Raghavan, head of Yahoo! Labs and Search strategies, argued in 2009: "people don't really want to search…their objective is to quickly uncover the information they are looking for, not to scroll through a list of links to Web pages" (Niccolai). Thus, the vertical integration of search engines have made it possible for them to spread their business action not just in the search market, but also in other niche markets. As it follows, results of search queries are not just blue links, but are richer results in order to meet users' demand, as Google universal search demonstrates and as the vice president of Yahoo! debated in 2011: "The answer is to re-imagine search. The new landscape for search will likely focus on getting the answers the user needs without requiring the user to interact with a page of traditional blue links. In fact, there may be cases where there are no blue links on a search results page at all" (Seth).

Eventually, at this moment in time, advocating for a neutrality and objectivity of results would lead to a reduction in search quality and a freeze in innovation of search engines, locking dominant search engines into an old Internet search model. In fact, search engines must have the freedom to customize their services and offer a wider variety of features and evolve from the role of simply supplying blue links to users. In turn, users are better off since benefit directly from this evolution with better, more personalized, accurate results and direct answers rather than just a list of URLS to choose from.

On the other hand, this doesn't mean that no supervision should be made over search engines. Firstly, transparency obligations have to be followed and abuse of power by dominant players has to be carefully tailored and needs to

have a narrow liability only in cases where a dominant search engine has deliberately modified its search algorithm to disadvantage rivals or other related service providers, without any reason of efficiency but just to enlarge market power. Thus, antitrust law should not aim at destroying market power of dominant players by limiting their innovative potentials in order to satisfy with increasing needs of users (Lao, 2013).

All being said, Google during these years has been investigated for having abused its dominant position in the search sector by altering search results in favour of its own specialized search services, hindering sound competition in both the search engines' market and related vertical niche-markets.

Article IV. SEARCH ENGINE ENVIRONMENT

Section 4.01 Industry, Competitors And Organic Search

Search engines are very popular among users, because provide organized access and search results to the vast and increasing quantity of content that is present on the web, and very valuable among advertisers, because they offer targeted access to users by matching advertisements to the body of the search queries.

Undoubtedly, search engines operate in a particular two-sided market, giving a connection platform to users that search for web-data and advertisers, which search for an effective way to reach customers. Usually, search engines do not charge users for their services, while instead charge advertisers for spaces on web pages that can let them reach better customers with their marketing campaigns. When submitting a search query, users reveal personal information that shows their actual interests and needs, giving the opportunity to

advertisers to accurately shape advertisements around the needs of users. The fundamental feature of this type of two-sided market is that the only group that is charged for using the services are advertisers, meaning that access to users' attention is highly valued by them.

The central function of web search engines is to deliver the most relevant results to a query, using all the indexed content available on the Internet. The central portion of content provided to the users of search engines are organic search results, which are the links created by a search engines' own information arrangement processes. So as to provide organic search results, search engine programs regularly scan the web in order to rank content available on the web and be as precise as possible when answering users' queries. The procedures and principles underlying such web-content ranking are different from one search engines to another, making it one of the only few features that distinguishes one from another. Basic techniques and principles used by search engines algorithms are:

- Crawling and indexing: Search engines rely on particular types of programs that crawl the web and index all the content that they find (econ, 2009). When submitting a query, the search engine algorithm matches as precisely as possible the keywords in the query to its index of web content, so even considering if the terms are also present in the title or in various tags of different web sites. In this context, Search Engine Optimization (SEO) has become considerably important especially in the latest years, after Google changed its algorithm. Actually, websites need to carefully follow SEO rules in order to be placed at the top of search engines results. From this point of view, search engines have a lot of power since it has been shown that only 5 % of users reaches the end or the second page of search engines' results (Me, 2013).

- Reputation: For improving the ranking of search results is fundamental the level of reputation of a website (econ, 2009). A website reputation is given by the number of links on other websites that point to it, with links on other important websites that increase drastically the ranking of a website.
- Personalized search: The major web search engines automatically obtain and register a big quantity of private information as well as information on users' past queries, including the domain of the web site requested, browser type and language, computer IP addresses and exclusive information taken from cookies (Godoy, 2006). The use of this information is fundamental in order to improve search results and better address them to the specific user needs. Moreover, the analysis of past user behaviour increases the precision of search results: Previous results of search queries are used and analysed to improve search results. For example, including results of user behaviour taken from previous search queries can meaningfully increase the ranking and the precision of search results (econ, 2009).
- Different criteria are used to measure the quality of a specific search engine, like the exactness of the results given compered to the key words of the query, and/or the uniqueness of the results it provides.
- Another main factor underlying the quality of a search engine is the web coverage and the oldness of the results shown. Actually, indexes do not always contain all the data available on the Internet, and web coverage sometimes is different from one country to another, especially where regulations limit their freedom to crawl the web for new content. Another important difference among search engines is the level of accessibility that they have. All major search engines are accessed without any cost either from the web address bar or from specific toolbars both in browsers or/and webpages. For example, Google paid a lot of money to be the main search engine in Firefox browser and

YouTube, which is the second biggest search engine in the web, and which is now owned by Google itself.

- Finally, search engines also differentiate their web search results by providing, and more importantly, efficiently displaying additional features like: a picture and video search, an email search, a book search, a newspaper search and a maps' search, which highly increase perceived value to users.

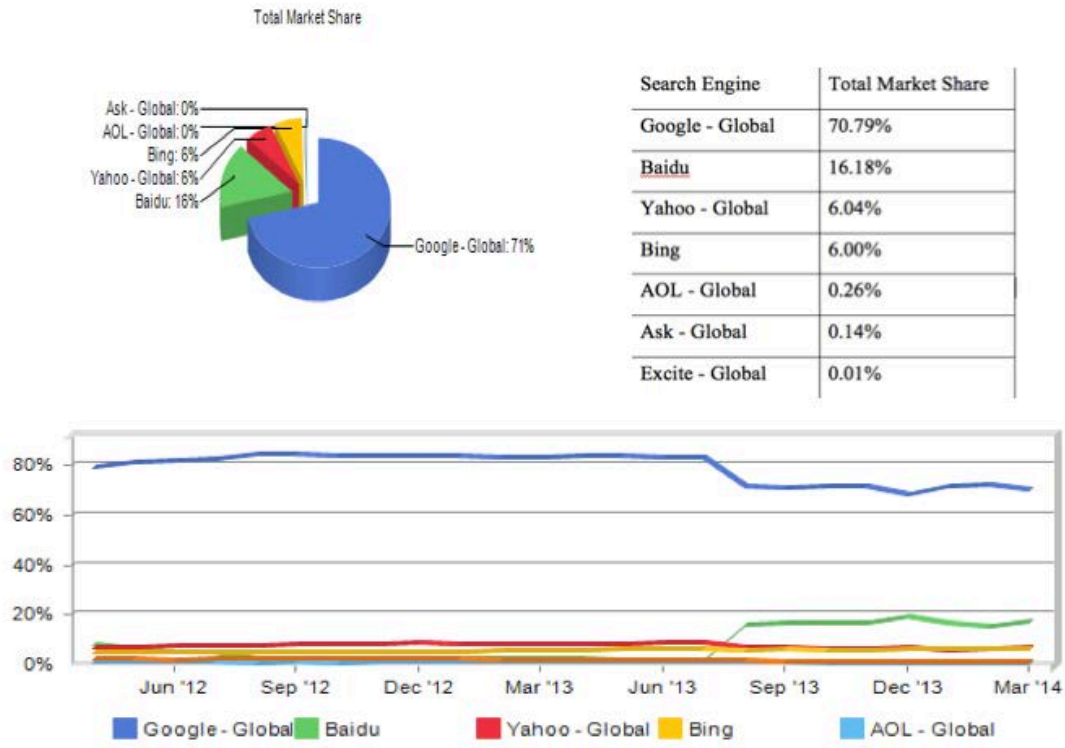
A distinct feature of the SE environment is that players in the market have to face high initial-fixed costs but future low variable costs, since the cost of dealing with an (one) additional query is close to zero. Fixed costs in the SE environment are produced by two important factors:

- Research and development (R&D) costs: Significant spending is done for R&D in order to conserve and continuously improve the quality of search and advertising tools and remain competitive over time due to the fast evolution of the market.
- Server infrastructure costs: The costs that are linked to the support infrastructure of search engines that permits them to operate, crawl and index the web, effectively and precisely link search queries with the advertisement. Since the server requirement is very large in order to permit search engines to operate successfully, this infrastructure cannot be centred on off- the-shelf servers, but necessitates of tailor-made solutions. The server infrastructure can be considered for search engines a sunk cost since it becomes rapidly out-dated and depreciates very quickly (econ, 2009).

As it is possible to observe so far, the search engines that operate in the market perform mostly similar activities and have structured their core services, the web-search, the search-based advertisements and extra services as a two-sided market, performing mostly parallel activities. However, there are significant

differences in the quality and accessibility that are offered by search engines to users due to different levels of web coverage and depth of information on users' preferences and past behaviours. Furthermore, due to high initial-fixed costs and maintenance costs over time, there is a significant possibility to have differences in quality and performance among search engines. Few players that take up the majority of the market share while several others have a market share close to zero, as mentioned above, characterize the search engine industry. The market leader among the desktop search engines is Google, with 71% of total market share, followed by Baidu with 16% market share, which is primarily used in China and that has stolen some m.s. from Google in the last months, Yahoo! with 6% m.s., which has seen its market share being eroded over time by the expansion of Google, and Bing, Microsoft search engine.

Figure 10

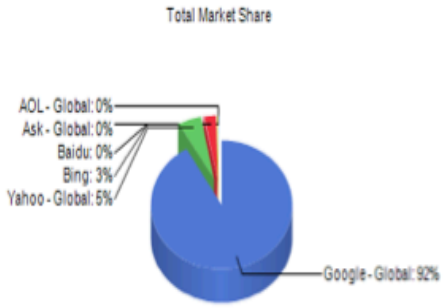


Search Engine	Total Market Share
Google - Global	70.79%
Baidu	16.18%
Yahoo - Global	6.04%
Bing	6.00%
AOL - Global	0.26%
Ask - Global	0.14%
Excite - Global	0.01%

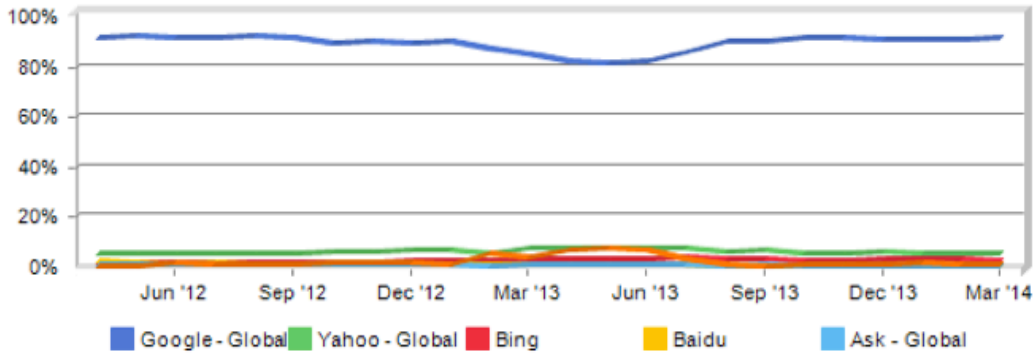
[8]

Similarly, also among the mobile/tablet search engines, Google is steadily over time the market leader with almost 92%, followed by Yahoo! with 5% and Bing with 3%.

Figure 11



Search Engine	Total Market Share
Google - Global	90.94%
Yahoo - Global	5.22%
Bing	2.57%
Baidu	0.17%
Ask - Global	0.14%
AOL - Global	0.03%



[9]

[8] Image 10 taken from (share, 2014)
[9] Image 11 taken from (netmarketshare, 2014)

Section 4.02 The Advertising Sector In The Search Engines' Environment

Following the growth of the Internet, the online advertising sector has gone through a massive growth too. While search-based advertising was already used from 1995, it wasn't considered as a valid way to reach users until 2001. One year later, when Google launched its own ad-network, AdWords, selling keywords based on Generalized Second-Price (GSP) auctions, the search-based advertising market has become one of the fastest developing markets on the Internet.

The online advertising market can be divided into two different groups: search-based and non-search-based advertising markets (econ, 2009). While search-based ads are displayed based on their relevance, with the subjects that are being searched, non-search ads are not placed in search results, but in websites. Furthermore, advertisements can be differentiated into contextual and non- contextual ads too (Commission E. , 2008). While non-contextual ads are not linked with the search queries or a website subject, contextual ads are matched to the specific context of a web site and the precise interest of a user. Moreover, it is possible to distinguish ads also on their appearance: only text or display. The table below explains the actual classification structure that characterizes the online advertisement sector:

Figure 12

Search-based ads	Non-search-based ads	
contextual	contextual	non-contextual
text	text / display	display

[10]

A search-based advertisement, opposite to organic web search that is a free service given by search engines, is instead charged. However, advertising slots that are displayed when certain key words are submitted are sold in bid where advertisers submit bids for keyword combinations. The principal pricing models, and ranking connected to it, are: "Cost per Click" (CPC) method, Cost per Mil-Impression (CPM), meaning the cost for one thousand times the ads are showed, Cost per Auction (CPA), meaning the cost for the users that complete the actions of the advertisement. Usually, the bid price increases for keywords that are chosen by many advertisers. Additionally, bids are also very important for deciding the position of the advertisement on the search result page. Therefore, ad-slots' assignment is not only based on advertisers' bids, but also on the amount of clicks that the ad is going to receive from users, the level of significance of the ad to the keywords in the queries, and ultimately the quality of the landing page, which is measured by specific quality scores (econ, 2009). Hence, the results of advertisers' bids and the quality score decide where an ad is positioned and how often is shown (Varian, 2008).

Additionally, advertisers' willingness to Pay (WTP) growths as the quality of the ad algorithm used to match ads with search queries increases, since it is easier for advertisers to better target users and attract them more easily.

As said above, starting from 2002, online advertisement providers have entered the online advertising market by creating their own ad-network. These ad-networks, which were also created to facilitate the sale of an ad-spot,

[10] Image 12 taken from (econ, 2009)

permitted advertisement service providers to be part of the intermediation process between owners of website space available for ads and advertisers.

Today's web search industry is characterized by significant levels of concentration that, together with the cost structure of managing a search engine infrastructure and with numerous network effects on both sides of the market, have created the possibility of a winner-takes-it- all competition where a single player can deter entry of other new firms, use its position in the market to corrode fair competition, thus by reducing the chances of competitors to catch up; and eventually win the market.

This situation is also supported by a consequent over-proportional increase in revenues of the dominant firm, which subsequently invests a greater amount of funds in R&D and server infrastructure, therefore permitting the market leader to further reinforce its dominant position, which is mostly non-contestable.

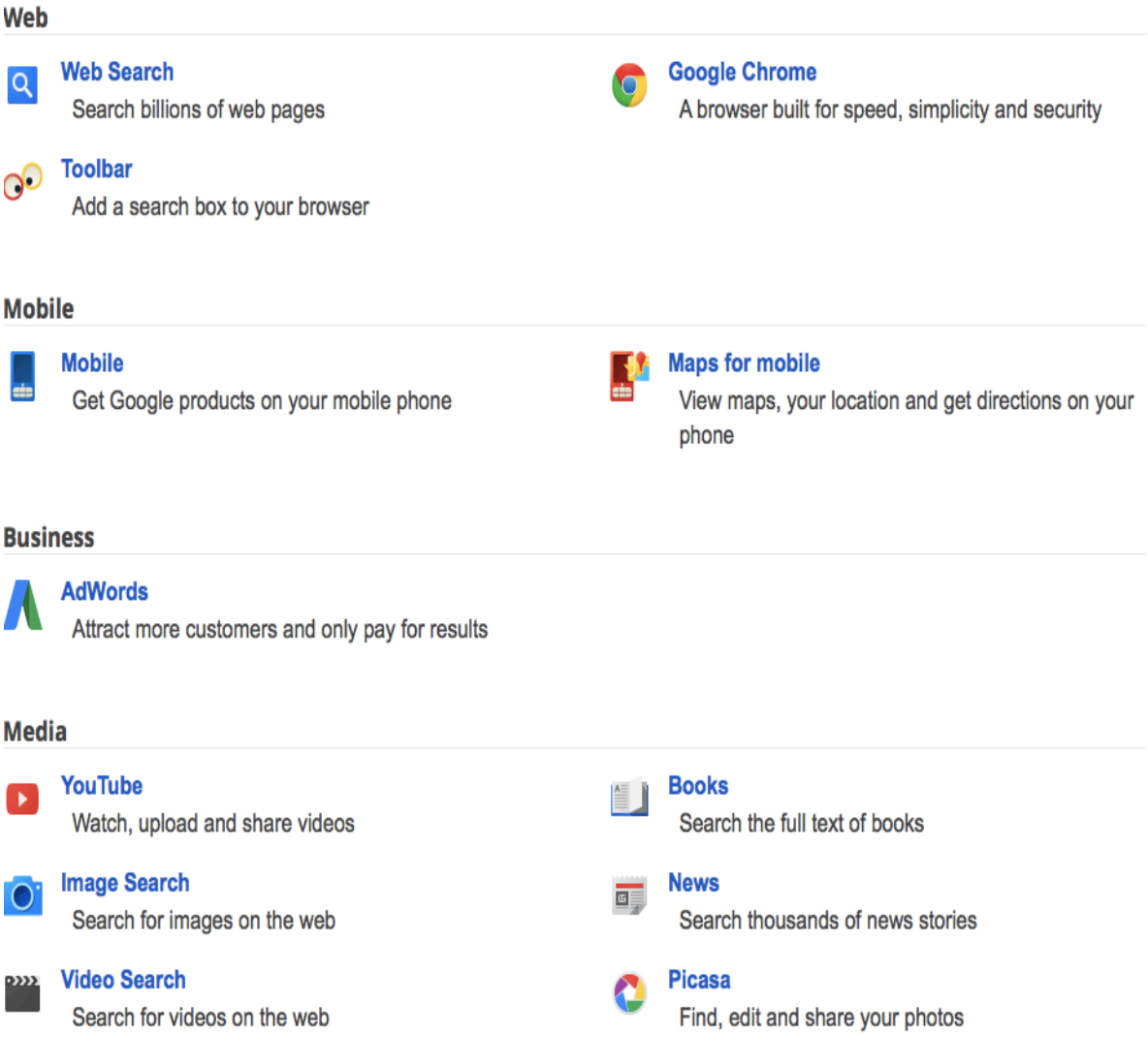
Because of these main features of the search engines' market, low contestability, strong concentration and abuses of market power are all realistic threat. As it is observable from the market shares graphs above, the rise of Google as a market leader during the past years could give rise potential abuse of market power with respect to competitors and new entrants.

Article V. GOOGLE INC.

Google Inc. is a company that has been created by Larry Page and Sergey Brin in 1998. It quickly became one of the most important search engines right from the beginning, competing effectively with already established search

engines like Yahoo!. The company's goal is to "organize the world's information and make it universally accessible and useful" (Google). Over the years, alongside its goal to index the information available on the Internet in order to help people seek the information they needed, Google has started to expand in other Internet markets and niches, by quickly becoming the leader in search engine design, development of advertising technology, Internet usage tracking software, desktop and mobile browser development, mobile devices' platform (Android, referred to the number of users), and ultimately Internet applications (Google -books, -Translate, Gmail, - shopping, - Scholar, - Maps). Thus, Google has been able to evolve from being a simple search engine to a multi-market service provider, offering its products in the relevant market-branches of the Internet, and competing not only with other search engines, but with firms in the niche markets.

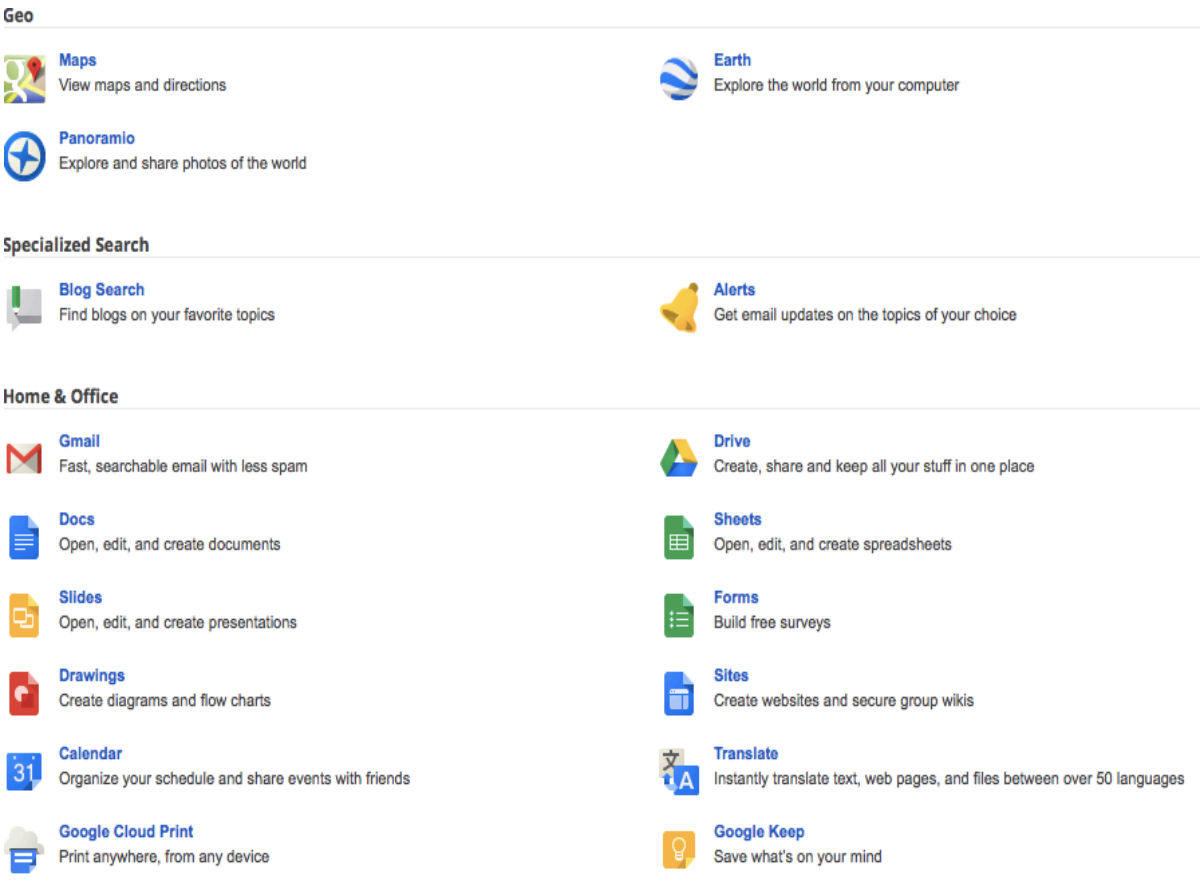
Figure 13



11

[11] Image 13 taken from http://www.google.it/intl/en/about/products/

Figure 14



[12]

In 2006 Google acquired the broadcast website YouTube while in 2007 introduced in the market its mobile operating system Android. With the acquisition of YouTube, Google has been able to technically dominate the web search market since YouTube in few years has become the second largest search engine on the web, right after Google itself. While with Android, Google has been able to capture the entire low- to middle-end segment of the smartphone market at the expenses of Apple with its iOS.

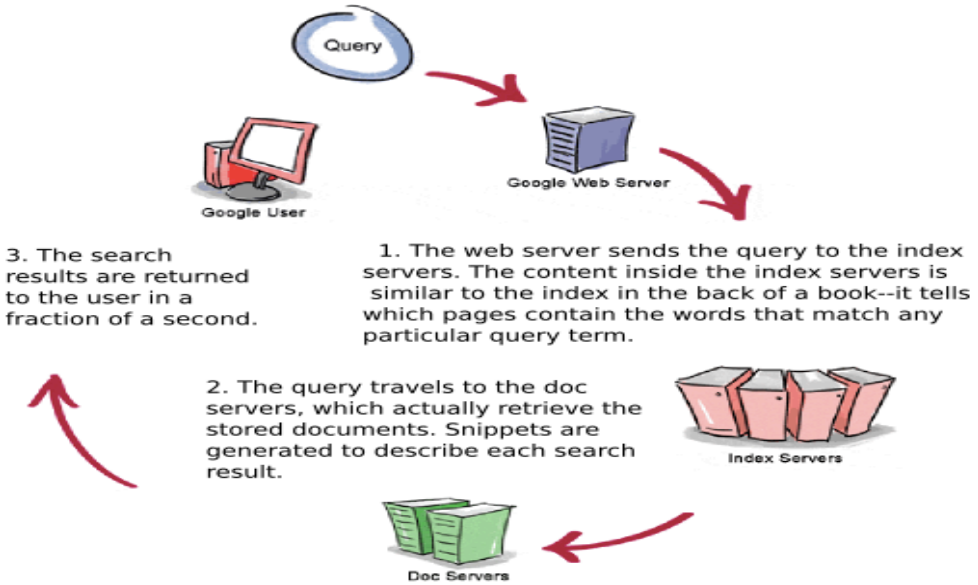
However, the main core advantage that has permitted Google to have a

[12] Image 14 taken from http://www.google.it/intl/en/about/products/

competitive advantage over other search companies has been its search algorithms and its ability to keep up with the increasing demand for better and superior quality information by users.

While Google shares publically facts on its algorithms, instead keeps secret their core functioning. Behind the results of a query posted on Google there is the work of software called spider that continuously crawl webpages for new information. Spiders start by fetching certain webpages and then follow the links on those pages and fetch the pages they point to. Subsequently, these pages are indexed and become part of Google's search Index, which is actually well over 100,000,000 GB of size and is used to display answers when users submit a query. Furthermore, when a query is submitted, Google algorithms start searching for pages that are linked to the keywords of the query in its index and display results by ranking, thus by the level of relevance that they have with the search query.

Figure 15



13

Google's most important algorithm feature is the PageRank system, which ranks pages by the quantity of outside links that point to it and by the quality

[13] Image 15 taken from http://www.ecomtom.com/2010/06/life-of-google-query.html

of these links, is applied to the entire web and is query-independent. Consequently, web pages before being included in search results are also checked for spam in order to keep results relevant.

A webpage PageRank depends on three factors:

- Frequency of keywords mentioned in a Web page and their location in it: If the words appear only few times and in parts of the page that are not at the core of it, the webpage will receive a low score.
- The age of the webpage: Google's PageRank system is able to analyse the pages that have been previously indexed by spiders and value them for their first appearance on the web. Pages that are present on the web for more time get a higher score.
- The number of outside links that point to the specific webpage and their quality.

Moreover, it takes into account also other factors like:

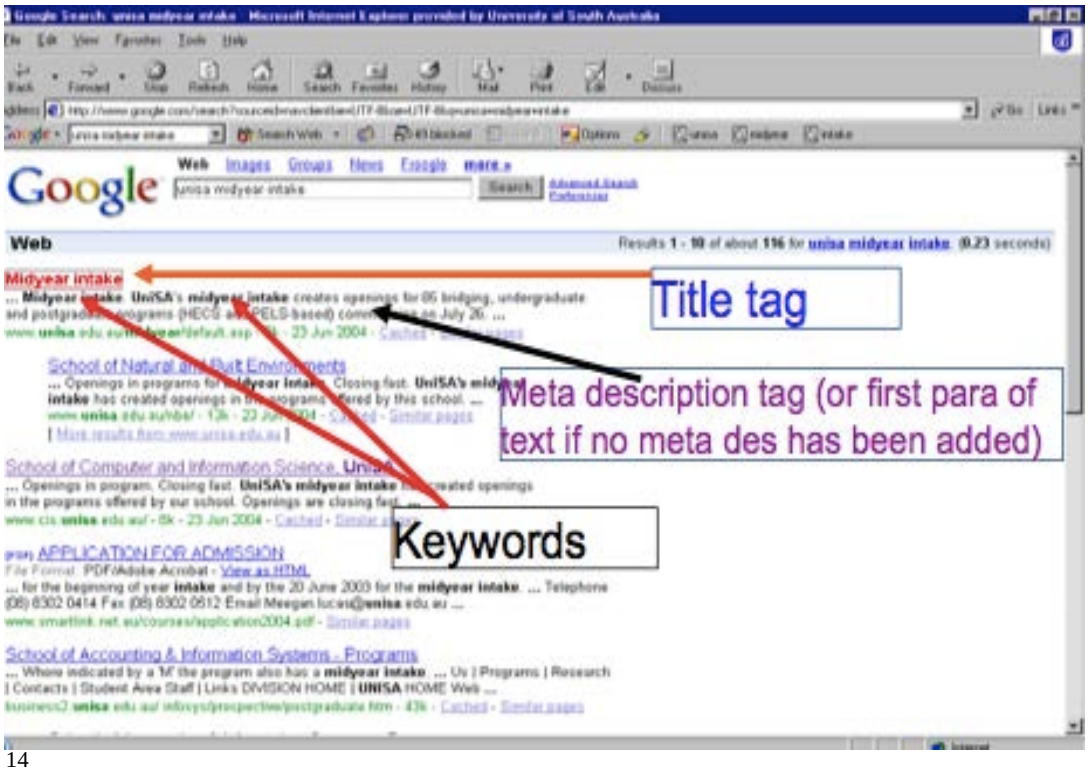
- Uses the text around hyperlinks in order to have a more precise document retrieval
- Word proximity in documents is taken into account
- To weight words uses word position, font size, and others
- Stores the entire raw html pages

Since its introduction, webpages have begun to follow guides that Google published on its website in order to have a better score and be placed among the search results in the highest possible spot. In other words, in order to have a better ranking on Google results websites began to perform on their webpages Search Engine Optimization (SEO).

Actually, SEO is based on changing a webpage in order to make it more "readable" by crawlers, which read only words. Thus, webpages must be careful when choosing the domain name, quality and number of inbound and

outbound links, keywords used on the webpage and their location, title tags and meta-description tags as well as alt tags.

Figure 16

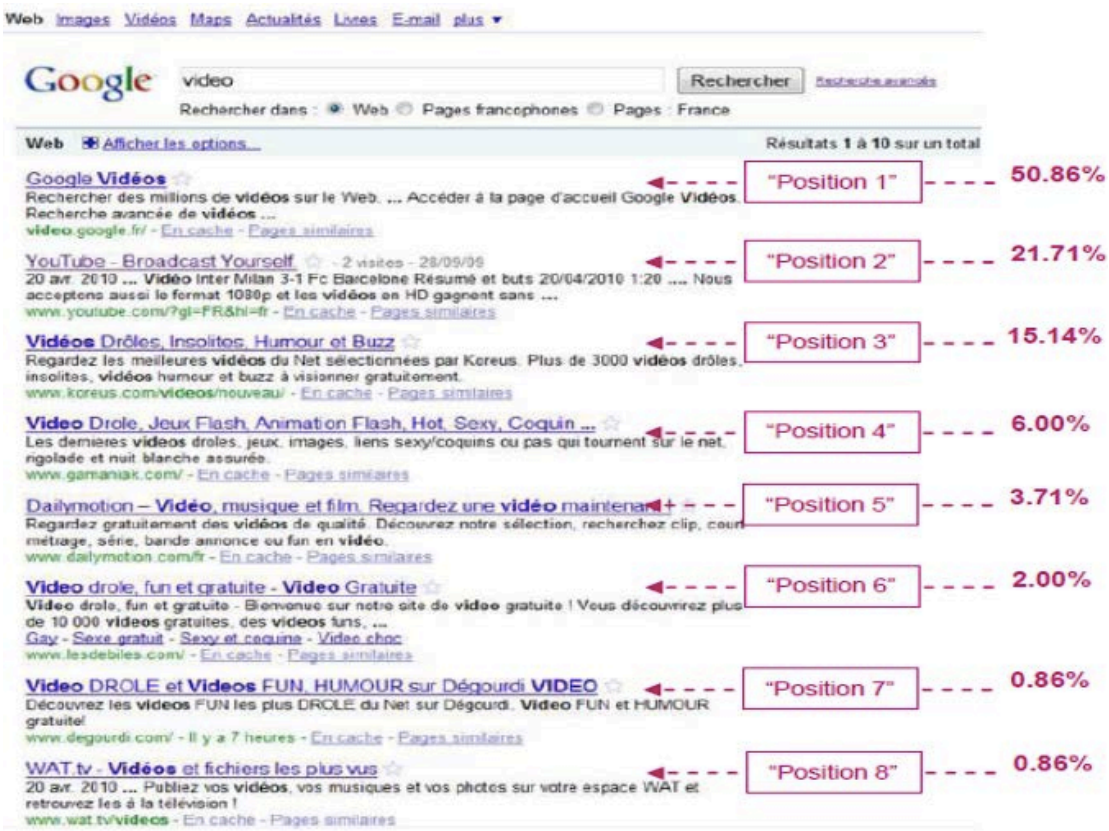


14

Moreover, SEO has emphasized the need for websites to be in the really first results of Google queries in order to be more popular and have better possibility to be accessed by users. In fact, it has been seen that users tend to choose the very top sites and rarely scroll down to the bottom of the Search Engine Result Page (SERP), or to the second page.

[14] Image 16 taken from (Renda, Competition and high tech markets, 2013)

Figure 17



15

It is easily observable how position in the SERP is linked to the access of users to a webpage and to the survival and business of that page (Renda, 2013).

In 2007 Google updates its web search introducing Google universal, blending results from vertical search engines like YouTube, Google images, Flickr or Google maps into the SERP. For the first time Google includes not only webpages in the search results but also images, news, places, books, videos and much more.

[15] Image 17 taken from (Renda, Competition and high tech markets, 2013)

Figure 18

16

Figure 19

17

While in 2010, with the "Caffeine Update" Google has changed the way pages

16 Image 18 taken from http://www.premiumseosolutions.com.au/blog/seo-news/hot-on-google-universal-search/

17 Image 19 taken from http://blog.milestoneInternet.com/education/universal-search/

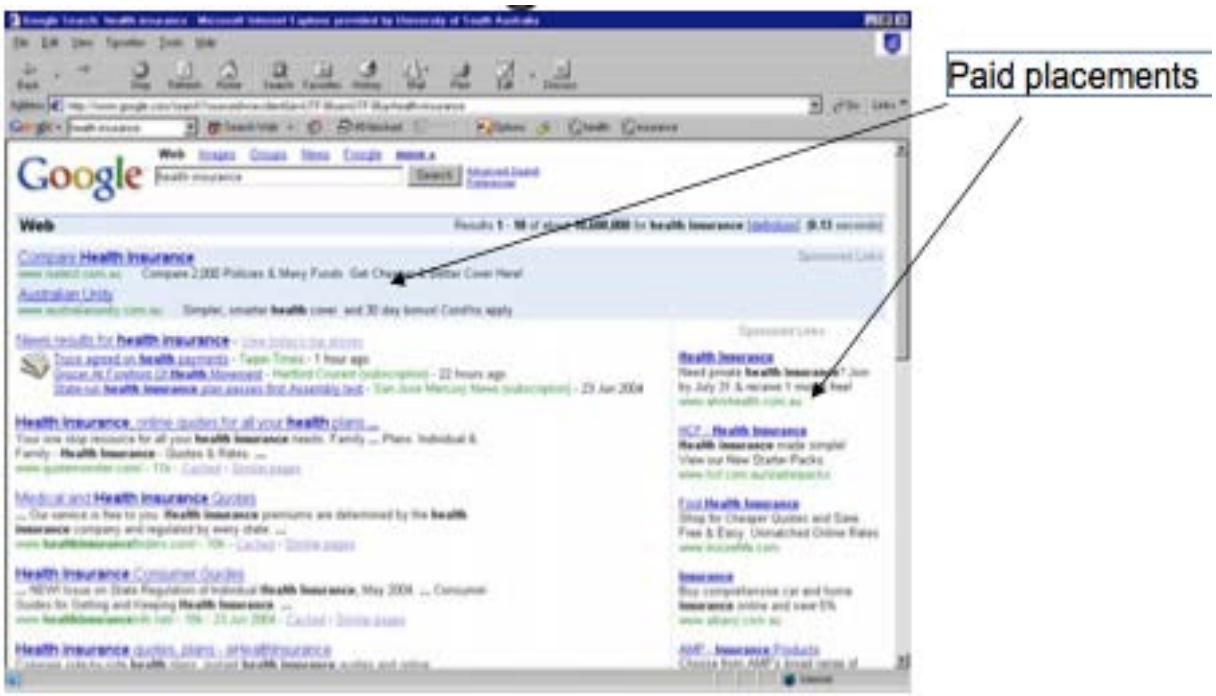
were ranked and indexed, reducing the time between the indexation of a webpage and its availability in the search results, reporting live information instantaneously in web search results.

Additionally, in 2013 Google launched its new search algorithm "Hummingbird" that changed the way web search is done:

- Instead of analysing results from a keyword point of view, it looked at the searcher intent of performing the query.
- Handles better conversational queries
- Doesn't only analyse keyword but also their synonyms on webpages

Google has also been able to structure its SERP in a way that ads could be displayed in a harmonic way with the search results, and could be related with the queries of users and their past behaviour. Actually, Google divides advertisements between paid listing and paid placement. The former is about paying the search engine to be included in the index of a web search, while the latter is about paying in order to be listed in organic search results, meaning that higher fees give higher ranking.

Figure 20



18

However, the secret behind Google success is to be found in the amount of people that use it when they need to search for information. As already discussed above, leader SEs undergo economies of scale since the cost of providing extra information is almost zero. Yet, initial and maintenance costs are very high. Search engines grow as more people use them, meaning that the more the data and the better a search engine and its algorithms are, the better will be search results and their relevance. Thus, Google has been able to use both its core values, and gain competitive advantage, and the increasing amount of users to grow bigger and bigger, while other competitors have seen users switch to Google and their search result less precise. Being the market leader and managing the majority of revenue streams in the search engine market has permitted Google to remain profitable but at the same time charge nominal advertising fees.

[18] Image 20 taken from (Renda, Competition and high tech markets, 2013)

Section 5.01 Why is Google not a Two-Sided Market?

As mentioned above, search engines operate in a two-sided market, where they connect users to advertisers. At first it might seem obvious, but instead search engines, and in particularly Google more than others, operate in a particular type of bilateral market. Two-sided markets are "economic platforms having two distinct user groups that provide each other with network benefits" (GEOFF PARKER). Google in this sense acts like an intermediation platform between two different types of operators, search engine users and advertisers. Before analysing the two groups, it is important to notice that Google doesn't charge anything to users for its services: users can use Google search without having an account or using other Google services, and vice versa, using Google services can be done without using Google search. As already said, Google, and search engines in general, display search results in two ways: organic results, own-product-placement results. Users can access Google in different ways like Google site, other websites, browsers, toolbars or mobile applications. The other group that operates on Google's platform is advertisers, which acquire advertisement slots that will appear on the search result page. As seen above, advertisers value a lot these slots because are able to reach better users since Google matches search queries and past user behaviour with ads, and for these reason advertisers are the only paying group. Thus, on Google platform occur two types of transactions: one of users that search for information, and the other one for advertisers that want to reach the largest possible audience with personal-specific ads. Thus, the two transactions are clearly not linked since users are indifferent to the presence of ads. From this point of view, it is observable that Google, as it was imagined to be in the beginning by its creators, could arguably not include ads and charge professional users (e.g. companies) and still keep its services free for normal users. In this sense, the strategy of Google to sell these "ads spots" is not a structural characteristic but a business

strategy. Furthermore, Google doesn't operate in a perfect two-sided market since there is no clear evidence of direct and indirect network externalities:

- Indirect network externalities are not essential in this case since advertisers receive higher value and are more interested if a lot of users use Google, while users don't consider fundamental the presence of advertisers on the platform. Actually, users receive little added value from ads, only in 10% of times users positively use advertising spaces (Jansen B., 2008). It also happens that in several cases users receive negative network externalities because of too many ads displayed.
- Direct network externalities are not intrinsic of this type of market since on one side advertisers face a high level of competition in order to get the best ad-slots, while on the other side, users are indifferent to the amount of other users. Even if Google is able to give better results as more users use it, thus more users mean also better results, the accuracy of these results is passed on past queries. So, it's not the case of network externalities, but of economies of learning.

All being said, the market in which Google operates should be better represented by a value chain characterized by constant and unilateral network externalities. At the upper side of the chain Google in exchange of search results receives personal information of users, and buys another part of users' personal information from websites and software (browsers mainly). Instead, at the lower part of the chain there are advertisers, which acquire form Google users' information in order to better create targeted advertisements.

As seen above, advertisers bid the price of the ad-slot and pay the second highest price of Cost per Click. Thus, the advertisers pay for the clicks on that ad-slot until their budget ends. Actually, is pretty straight forward to notice that advertisers have constant and unilateral network externalities based on the

number of users that are being targeted directly related with the value for advertisers; more users being targeted more value for them (Luchetta, 2013).

Article VI. ANTITRUST REGULATIONS AFFECTING GOOGLE AND THE SEARCH ENGINE ENVIRONMENT

Antitrust can be considered a form of economic regulation done by governments over economic activity of undertakings: antitrust regulations and competition laws are primarily made in order to assure sound competition in each segment of the broader market, protect consumer welfare and avoid abuse of market power by dominant firms. Actually, Competition is an instrument of the market economy that:

1. Supports companies in offering goods and services at the most satisfactory term to customers,
2. Boosts productivity and innovation,
3. Reduces prices and is welfare enhancing.

In order to be sound, competition requires companies to be independent between each other, even though still affected by the competitive pressure of the other players. Furthermore, competitive pressure can be exercised by firms not currently active in the market or by potential competitors that threat to enter. Thus, the two central rules govern competition in the EU are Article 101

and Article 102 of the Treaty on the Functioning of the European Union(TFEU).

The Article 101 of the Treaty forbids collusive behaviour among two or more independent undertakings that limit healthy competition within the market and hamper consumer welfare. More specifically if prohibits “all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market” (European Commission, 2013). This Article regulates at the same time horizontal agreements, among actual or potential competitors operating at the identical level in the market, and vertical agreements, between firms working at different parts of the supply chain. The most frequent illegal conduct braking Article 101 regulation is the formation of a cartel in order to fix prices/limit costs and/or divide the market share between two or more competitors. Instead, the Article 102 of the Treaty prohibits undertakings that have a leading position in a specific market to abuse of their market power. More exactly, it says that “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” (European Commission, 2013). This abuse of market power could be done either by directly or implicitly asking unjust prices, by restricting production, or by declining innovating at the expenses of customers. Thus, abuse of dominance refers to three different types of conduct:

1. **Exclusionary abuses**, which can determine the exit of rivals from a relevant market;
2. **Exploitative abuses**, that include excessive pricing and/or price discrimination
3. **Reprisal abuses**, aimed at discouraging competitors from filing suit.

By analysing more deeply these two articles it has to be made a clear definition of two key concepts: dominance and market definition.

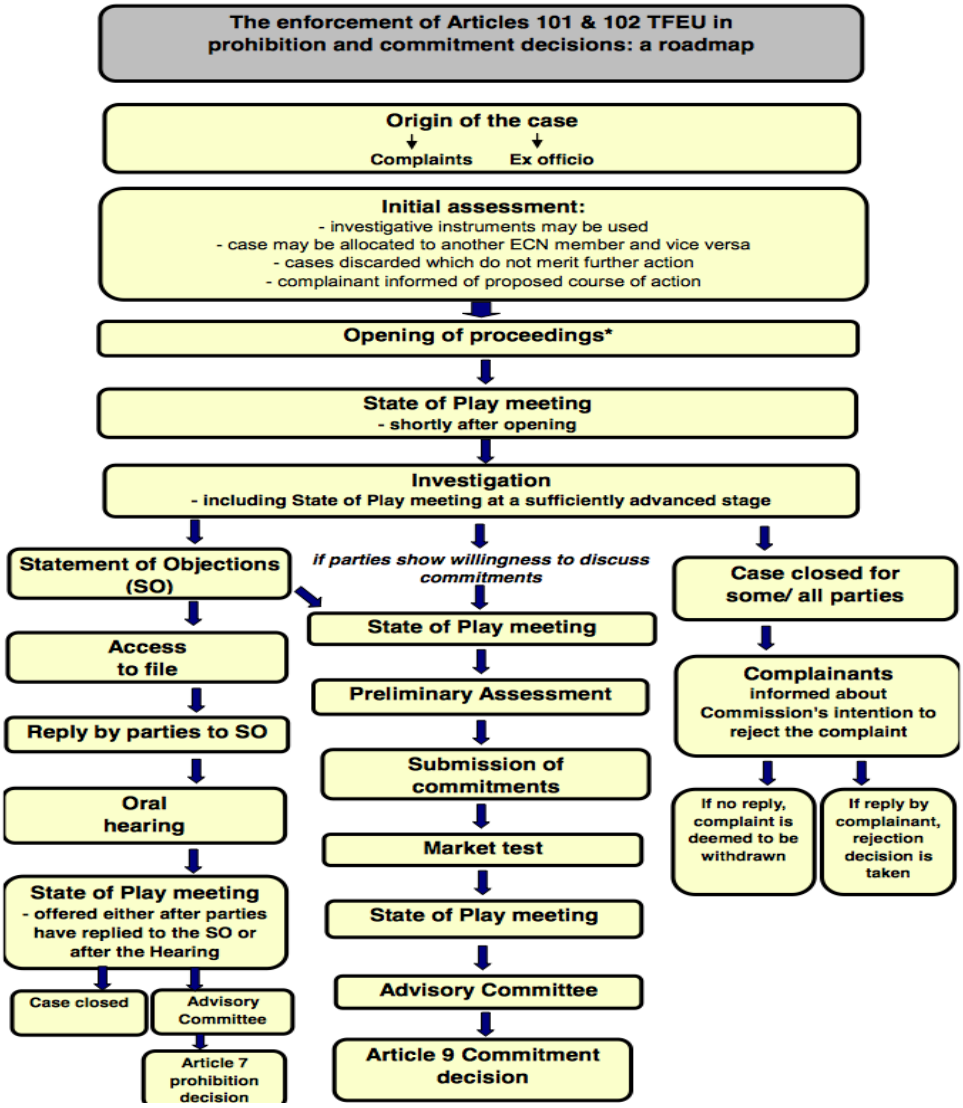
The first concept is dominance, or more generally market power of a firm, which is an aspect that is very closely challenged by antitrust laws. The simplest meaning of market power can be found in “the ability of a firm (or group of firms) to raise and maintain price above the level that would prevail under competition is referred to as market or monopoly power” (OECD, 2002). In the EU, the concept of dominance is referred as “ The power to behave to an appropriable extent independently of competitors or to gain an appreciable influence on the determination of prices without losing market share” (Renda, 2013). After having defined dominance, it has to be made a clear interpretation of market definition and “relevant market” in which an undertaking operates. More formally, a relevant product market “comprises all those products and/or services which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics, their prices and their intended use” (European Commission, 1997), while a relevant geographical market “comprises the area in which the undertakings concerned are involved in the supply and demand of products or services, in which the conditions of competition are sufficiently homogeneous and which can be distinguished from neighbouring areas because the conditions of competition are appreciably different in those area” (European Commission, 1997). A common test that is performed in order to define a relevant market for a specific firm is the SSNIP test, which tries to identifies the smallest possible market in which a firm, which holds market power, or a cartel impose a “Small but Significant Non-transitory Increase in Price” (SSNIP) (Renda, Markets, Regulations, and Law, 2013).

When analysing the search engine market, which can be considered a particular type of market due to its high fixed costs and close-to-zero marginal costs, it is possible to observe different network externalities that can bring to

several consequences when dealing with the concept of competition. Firstly, the search engine market is characterized as mentioned above by direct network externalities that follow Metcalfe's Law, which states that the importance of a network growths exponentially with the amount of users on the network. Secondly, learning effects constantly take place in the search engine market, proving that customers are path-dependent and use different search engines (or just one) to deal with their needs and are reluctant to switch to another one. Still, switching costs are almost zero, since the next available search engine can be reached at a click-length, as Google has emphasized in one of its advertising campaigns. Actually, more than 60% of search engine users operate with a minimum of two different search engines when searching for information, meaning that Google assertion is somewhat true in the end. Thirdly, as seen above, the search engine market can be considered a particular type of two-sided market. Thus, the search engine market faces aggressive competition but due to its low switching costs is not a winner-takes-all competition for some scholars. Instead, other scholars see the search-engine market as a "winner take-all" market especially because of these network effects that permit innovative firms to produce huge revenues and market share over some period of time. Hence, when a firm has a high level of flexibility, with these network externalities is able to perform an increasing level of dominance over the other market competitors that will result in an ever-decreasing level of competition, since the more valuable is for people to share with other peers the same network, the more a dominant firm can capture an increasing number of users; as also stated above with Metcalfe's law.

The way Articles 101 and 102 are enforced by regulators when a case of anticompetitive behaviour or abuse is performed, as explained above, follows a precise path laid down by the EU Commission:

Figure 21



19

[19] Image 21 taken from (European Commission, 2013)

However, antitrust regulation is not always welfare enhancing by limiting market participants in their activities, therefore it is also subject to failures. In fact, an error-cost framework is a tool that is not always used in antitrust practices, but that should be better taken into account by regulators. It is possible to find two different types of results in the error-cost framework: Type1 (false positive) and Type2(false negative) errors. It has to be said that errors are inevitable in antitrust cases because of the difficulties that regulators incur when analysing efficient and competition enhancing conducts with anti-competitive ones. However, Type1 errors cause higher social costs than Type2 errors since market forces compensate some of the Type2 errors while for the Type1 there is not a lot to do. Furthermore, usually happens that regulators when deciding if a conduct is anticompetitive or precompetitive choose to prematurely condemn any conduct that is novel or not completely understood as anticompetitive. In this prospect, the search engine environment, but in general the IT sector, are closely related to innovation and continuous new product developments, thus there is a greater possibility for antitrust errors to occur. The reason behind it is because innovation involves new products and practices that at the beginning can be misunderstood by Courts and seen as anticompetitive, hence hampering the innovation process itself. A recent example of antitrust errors can be seen in the way the Microsoft case has been solved by regulators: the main error in this case was not in the Court final decision, but instead regarding the way it was approached in order to assess the economics of the case. The approach that regulators had in assessing the exclusionary conduct undertaken by Microsoft in specific categories was fact-specific and not debatable. On the other hand, their approach to Microsoft monopoly power determination has been more concerning and complicated: the Court's determination of market power was based on economic assumptions, ad hoc resolutions of economic cases and a lack of direct economic evidence. The result was that the Court based its final decision on a theoretical analysis of business conducts that for sure granted market power to

Microsoft, even though there was no empirical evidence that could back up the economic theory (WRIGHT, 2011).

Section 6.01 The (Not) Straightforward Economics Of Google

After several years from the Microsoft case, the Google case that EU antitrust regulators are assessing, even though close to its end, might lead to undesirable results. But before analysing what Google has been investigated for, is useful to assess in which parts of its economics, Google has market power. Firstly, as seen above, Google is a dominant and innovative high tech firm, exposed to a high level of competition, and that can be seen as analogue to how was Microsoft a decade ago, making it highly exposed to antitrust interventions that are mostly active in the high tech world. Secondly, Google's primary business is information, which is a sector that is still not well understood in all its aspects. Furthermore, defining a relevant market for Google is quite problematic since the economic aspects and connections of its business are poorly understood. Thirdly, Google doesn't operate only in the search engine market, but also has large shares of other niche Internet markets in which it actively participates (Digital books, maps, news, etc.). Thus, Google competes not only with other search engines (SE) but also with "vertical search engines". Vertical search engines are mainly e-commerce websites with search functionalities that are content specific: Amazon for books, EBay for auctions, Facebook for social networks, and many others. When customers start bypassing Google and use one of these specialized sites to begin their search the value of Google's network lowers. Moreover, competition from vertical search engines is greater because click-through rates

are substantially higher when users are searching for somewhat to buy. If these vertical search engines develop their access and communication channels (like Amazon has done recently by developing its own search engine for consumers' search), Google could realistically lose a lot of its value and serve mainly lower-value traffic, losing valuable information for which advertisers pay it for. Clearly, it stands out that even though Google has a lot of market power, threats from small competitors could really pose a serious problem for its business. Finally, Google has few strong competitors that have already complained for anticompetitive conducts towards them (like Microsoft itself, for example) and a relative aggressive antitrust community that doesn't take into account much the error-cost framework analysed above.

Analysing instead the use that people make of Google, as seen above also, many consumers use more than one search engine when surfing the web, and their behaviour on each one is different, leading to a sort of product differentiation. Moreover, not every user uses search engines as its main Internet point of entry, implying that when analysing competitors in this market, this point of access should be also investigated.

From the above implications, which make the economics of Google very complex and not straightforward as it might seem in the first place, it stands out how hard is to assess the relative market definition of Google, necessary when bringing on an antitrust investigation, as well as the determinants of its market power. Thus, regulators could easily end up on basing their decisions on intuition, incomplete evidence, ad-hoc decisions causing Type1 errors (WRIGHT, 2011).

Section 6.02 Description Of A Relevant Market And Potential Abuses Of Market Power In The Search Engine Environment

The search engine (SE) market is a particular type of two-sided market, as also seen above, which requires a particular analysis of the main ways in which a dominant search engine could use its position to harm competition, users' welfare and advertisers' businesses, as well it is important to assess what can constitute a relevant market in the SE industry.

From the user side, their access to the web is mainly performed via SE, meaning that there is no optimal online or offline substitute to search engines from this point of view that could deliver with the same effectiveness the same outcomes. Thus, the online web search can be considered a relevant market from the users' perspective, although divided into geographical sub-markets due to linguistic boarders.

On the other hand, from advertisers' side, it is possible to distinguish online and offline advertising, as well as search-based and a non-search based online advertisement. The role of SE is to act as intermediaries between advertisers and users in order to have the highest correlation between ads and users' web searches. Here, the definition of a relevant market depends on the degree of substitution that advertisers have with other online advertising tools. In this case offline advertisement cannot be considered a valid substitute since already both the USA and EU antitrust regulators consider online and offline advertisements not substitutes at all. Nevertheless, the substitution of search-based with other online ads is threated differently: the EU claims that search and non-search ads are to certain levels substitutes because, due to technological progress, the targeting of ads to specific users, which is the key different between the two, is becoming less prominent. Thus, the relevant market can be considered the complete online advertisement market divided in

geographical sub-markets due to linguistic boundaries. Instead, the relevant market for the delivery of intermediation facilities to advertisers is considered on a European basis at least from the EU regulators' point of view. Furthermore, Hahn and Singer extend this point of view arguing that the delivery of intermediation services has to be considered worldwide, not separated into geographical areas. However, the definition of a relevant market for the online advertising sector has to be very flexible since is linked to the technological progress and marketing strategies of advertisers over time (Hahn, 2008).

(a) Manipulation Of Market Power In Organic Search

Organic Search is a service offered by SE at no costs and that should be based on offering the best possible quality results to searchers' queries. Furthermore, it is very difficult for searchers to assess the relative quality of the results that a SE provides, causing a problem of asymmetric information. An abuse of market power by a dominant SE can be possible in the way that the best possible results are not delivered. It is possible to identify two different types of manipulations that a dominant SE can perform in order to extract rents by abusing of its dominance: a higher market position of its own products with respect to competitors and higher revenues from the advertisement sector.

The first manipulation can occur when the SE instead of listing organic search results based on the quality of the links and to the correlation with the queries submitted, gives higher placing to its own services. Therefore, users' attention is moved to the products of the SE, which might not be the best choice for users, instead of competitors' products that might give higher value to searchers. The results of this manipulation becomes less evident with time, since as more traffic is directed to its own extra services, and as it has been seen above even one position down in search results can hamper the

soundness of a business, its market position strengthens with respect to competitors, making it more difficult to prove that a manipulation has occurred.

The second manipulation can occur with the SE that lowers the quality of organic search results in order to direct the most part of traffic to ads that are given also a better rank position. Moreover, the manipulation can also occur with the SE that places sponsored links in a suboptimal manner, placing the most relevant ones at a lower position.

(b) Abuse Of Market Power In Advertising Intermediation

SE sells advertising slots in auctions between advertisers, like Google AdWords, although their influence is still substantial on the price that will be paid. Google, for example, decides which slots to allocate to advertisers based on bid price and quality scores. A higher quality score means that an ad will receive more clicks, increasing the revenues for the SE. In this way a SE can maximize its payoffs by improving efficiency in its allocation of ads. On the other hand, a dominant SE can also manipulate quality scores, which are for example secret for Google, and decrease the scores of competitors, thus raising their final price to pay, and block their ads. In 2009 Google has been blamed for purposely decreasing the quality score of Sourcetool, a competitor that received more than 90% of its traffic from Google, resulting in a bid price increase of 10’000%. Hence, Google was accused of driving Sourcetool out of business since the price was not anymore affordable (Reuters, 2009). The lawsuit ended with a mutual agreement between the parties.

Another way in which a SE can abuse of its market power is by influencing its private ad-network. Perhaps, a SE can penalize advertisers that operate also in other networks by lowering their quality scores for example; or it could

reward advertisers that use only its ad-network by increasing their quality scores or by assigning to their ads a higher position (econ, 2009).

Article VII. THE GOOGLE INVESTIGATION AND THE EUROPEAN COMMISSION'S DECISIONS

Following several complaints by search service providers (mostly Microsoft Bing, Yahoo!, Yelp, TripAdvisor, and others) of unfavourable treatments of their services in Google sponsored and organic search results, the European Commission has decided on the 30 of November 2010 to open an antitrust examination claiming that Google had abused of its dominant position in online search with a preferential placement of its own services with respect to competitors, thus breaching the Article 102 of the Treaty on the Functioning of the European Union (TFEU). The EU Commission began investigating on:

- Abuse of the dominant position of Google in the marketplace of online search, hence lowering the PageRank or position of unpaid search results of competitors (vertical search services),
- Abuse of its dominant position of Google by giving to its own vertical services preferential placements, thus shutting out competitors,
- The possibility that Google has lowered Quality Scores of sponsored links of vertical search competitors, with a consequent price increase of the ad-spot,
- The allegation that Google has imposed obligations of exclusivity to its advertising partners, preventing them from using other categories of

ads from competitors with the aim of foreclosing competing search tools,

- The suspected restrictions that Google has imposed on the portability of advertising campaigns on other competing advertising platforms.

At the beginning of 2013 the Commission has adopted a preliminary assessment to Google in order to assess the business practices of Google. The results that came out of this assessment where:

- A preferential treatment in Google horizontal web search results of links to its own specialized search services compared to rival specialized search services:
    - It concerns the way links to its own vertical search services are displayed by Google in its web search results. Thus, Google with its own search services like Google Shopping, which is the service specialized in the research of products, doesn't tell consumers of these preferential treatment. Consequently, consumers are more likely to use only Google Shopping instead of competitors also, like Amazon in this case, placing their links lower in the ranking or in positions difficult to see even though are potentially more relevant, with the customers that need to scroll down the page or go to the second page. As seen above, the percentage of traffic changes drastically from one link to another, thus even a position less in the ranking can significantly hamper a business activity and reduce its (future) innovative process. Moreover, in this way the customers' choices are being limited to just one provider of services without the possibility or ease to change to alternative ones.

      The vertical search services of Google that are under investigation are: Google Shopping, Google Places, Google Hotel Finder, Google News, Google Finance and Google

Flights. Similarly, possible future services that might be given by Google preferential placements will be under investigation. As it is possible to see in the image below, Google search services seem to have a preferential position in Google web search results.

Figure 22

Vertical	Most popular vertical sites[232]	Example Query	Ranking of Google's own vertical site in search results[233]
Finance	Yahoo Finance, MSN Money	"finance", stock symbols	Google Finance: #1
Music	iTunes, MySpace Music, MTV	Artists: "lady gaga"	Google Music: #1
Health	EverydayHealth, WebMD, Wikipedia[234]	Major medial terms: "cancer"	Google Health: #1
Patents	FreePatentsOnline: iBiblio.org	"patent" + patent number	Google Patents: #1
Maps	MapQuest (Prior to Jan 2009)	Addresses: "420 west 25th street, new york, ny"	Google Maps: #1
News	CNN, New York Times	Current news: "health care bill"	Google News: #1
Scholar	FindArticles, SpringerLink	"legal journal articles"	Google Scholar: #1
Movies	IMDB, Yahoo! Movies	Movies: "Alice in Wonderland"	Google Movies: #1
Books	Amazon, Barnes & Noble	"the call of the wild"	Google Books: 2 of top 5; 4 of top 10 (Amazon #7)
Blogs	Blogger, Federated Media, Technorati	General search: "blogs"	Google Blog 3 of top 4
Code	SourceForge, CodePlex	"Cloud computing code"	Google Code: #1
Dictionary	Dictionary.com, Merriam Webster	Generic search term: "definition of homogeneous"	Google Dictionary: #1
Travel	Expedia, TravelAdNetwork, Orbitz	Flight origin & destination: "Boston to Denver"	Google Flight Search Lead Generation: #1
Video	YouTube, Break Media Network, Google Video Search	"Labrador puppy video"	Google YouTube and Google Video Search: #1 and #2
Weather	The Weather Channel, Weatherbug	"Denver weather"	Google Weather Lead Generation: #1
Images	Google Image Search, Photobucket, Flickr	"Iceland volcano image"	Google Images: #1
Mortgage Quotes	Bankrate.com, Lendingtree.com	"California mortgage rates"	Google Mortgage Rate Quotes Lead Generation: #1 Ad
Products	Yahoo! Shopping, Google Product Search, Shopzilla.com	"Gucci heels"	Google Shopping/Products: #1

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[20] Image 22 taken from (Renda, 2013)

- The use by Google without any agreement of the original content from third party websites in its own specialized web search services:
    - Google implements in its own specialized search services, the novel material retrieved from third party websites, like users' reviews, benefiting without any investment or the owner's will. The only option that Google has given to these websites, in order for its contents to not be part of the Google web search services, is to leave Google vertical services and horizontal web search services. This option obviously is not possible since Google is the major search engine for traffic and is not optimal for the most of these websites. The Commission concerns are regarding the possible reduction of innovative ability of these competitor sites, with also a reduction in ingoing traffic since it will remain on Google vertical search services, and the generation of new original content, which may in turn reduce consumers' welfare.
- Agreements that *de facto* obligate third party websites (publishers) to acquire all or the most quantity of search ads only from Google:
    - The Commission was concerned with the fact that in this way publishers could only display a limited quantity of online ads on their website, limiting the offer to customers. Furthermore, since Google in the last years in Europe has had a dominant position in the provision of search advertising, there is the possibility that consumers have a limited choice and that competitors, since would only reach a limited number of customers, might have less incentives to innovate.
- Contractual restrictions on portability of online advertising campaigns from Google to other advertising platforms:
    - The Commission was concerned with these restrictions since can generate artificial switching costs that limit advertisers that use Google AdWords to also use alternative advertising platforms

> with a consequent reduction in consumer choice. The result could be that advertisers might reduce their innovative process in developing new advertising tools.

As explained above, the results of the preliminary assessment showed that Google possibly abused of its dominant position in every field that permits dominant firms in the SE environment to extract rents from their market power, as seen in the previous section. These results lead the Commission to argue that these preliminary results could harm consumers by limiting their choice of web search tools, both horizontal and vertical, and hamper innovation and survival of competing services. Furthermore, the Commission position in regards to Google's dominance is that it holds a dominant position in the online search market and in the search advertising market with a market share over 90%.

After the EU Commission preliminary results, it began a debate since the US Federal Trade Commission, which previously had investigated the way Google displayed the links of its specialized search services in the organic web search results, decided that there was no abuse of the dominant power of Google over competitors and no harm for competition. However, the response of the EU Commission has been that in the USA the two main competitors of Google are Yahoo! and Bing (Microsoft), whose market share combined is around 30%. Instead in Europe Google holds more than 90% of market share, making it the first search engine to be used by customers, advertisers and vertical competitors. Thus, the commercial importance to users of Google in the European marketplace for specialized search services is much more significant than for the ones in the USA.

Google's proposals to address the concerns that have arisen from the preliminary assessment, since, until the beginning of 2014, the Commission

was not fully satisfied with changes made by Google, have been several. All the proposals had a life period of 5 years and had to completely address the concerns on the 4 areas highlighted by the EU Commission.

The first proposals of Google in April, 2013 were:

a) “Label promoted links to its own specialized search services so that users can distinguish them from natural web search results,
    1) Clearly separate these promoted links from other web search results by clear graphical features (such as a frame), and
    2) Display links to three rival specialized search services close to its own services, in a place that is clearly visible to users,
b) Offer all websites the option to opt-out from the use of all their content in Google's specialized search services, while ensuring that any opt-out does not unduly affect the ranking of those web sites in Google's general web search results,
    1) Offer all specialized search web sites that focus on product search or local search the option to mark certain categories of information in such a way that such information is not indexed or used by Google,
    2) Provide newspaper publishers with a mechanism allowing them to control on a web page per web page basis the display of their content in Google News,
c) No longer include in its agreements with publishers any written or unwritten obligations that would require them to source online search advertisements exclusively from Google, and
d) No longer impose obligations that would prevent advertisers from managing search advertising campaigns across competing advertising platforms.” (European Commission, 2013)

Following the above proposals, the Commission took 1-month time to perform a market test with the commitments proposed by Google. If the results were satisfying and could be a valid solution to competition problems, the commitments could be made legally mandatory on Google under Article 9 of the European Antitrust Regulation, which imposes Google to respect the agreements and, in case of breach, the Commission can inflict a fine up to 10% or total worldwide annual turnover.

However, the first proposals of Google to solve the 4 concerns of the Commission were not satisfying and on February 2014 improved proposals were presented to the Commission. For the first concern, regarding how Google places specialized search services of competitors and for how its own vertical search services are given special treatment; the following proposals have been made:

a) A label showing that Google's own specialized search services are being promoted will inform users.
b) In order to make the distinction of specialized search services with organic search results, it will be placed a graphical separation in order to have a clear distinction between the two different types of results.
c) Google will show, regarding vertical search services, other proposals by three other rivals, which are chosen with an objective method from a "Vertical Site Pool". In this way users will be able to compare them with Google's own specialized search services, including for search results displayed on mobile devices (e.g., if Google vertical search services' links have pictures, also the other 3 rivals displayed will have images and they will have total control of how they want to present them).
d) Rivals will not be charged for inclusion in cases where Google also does not charge for inclusion in its own vertical search services.

For the second concern, regarding the way in which Google uses a third party (mostly specialized search services' rivals) original content in its own vertical search results; the following proposals have been made:

a) Permit third parties to freely choose if to remain on Google vertical search services' results or to not be included anymore, without any influence on their rankings in Google's organic search results or in Google's AdWords network. A more general opt-out option will be given to all websites, on a "subdomain by subdomain basis". Instead, to news publishers, in order to better control their content on Google News, it will be given a more exclusive opt-out option, with higher granularity and higher control.

Instead, for the third concern, regarding agreements that *de facto* obligate third party websites (publishers) to get all or the most quantity of search ads only from Google; the following proposals have been made:

a) To not include anymore in its contracts with a third party website (publishers) any written or spoken commitments that would bind it to only use online search advertisements from Google.

Finally, for the last concern, regarding contractual restrictions on portability of online advertising campaigns from Google to other advertising platforms; the following proposals have been made:

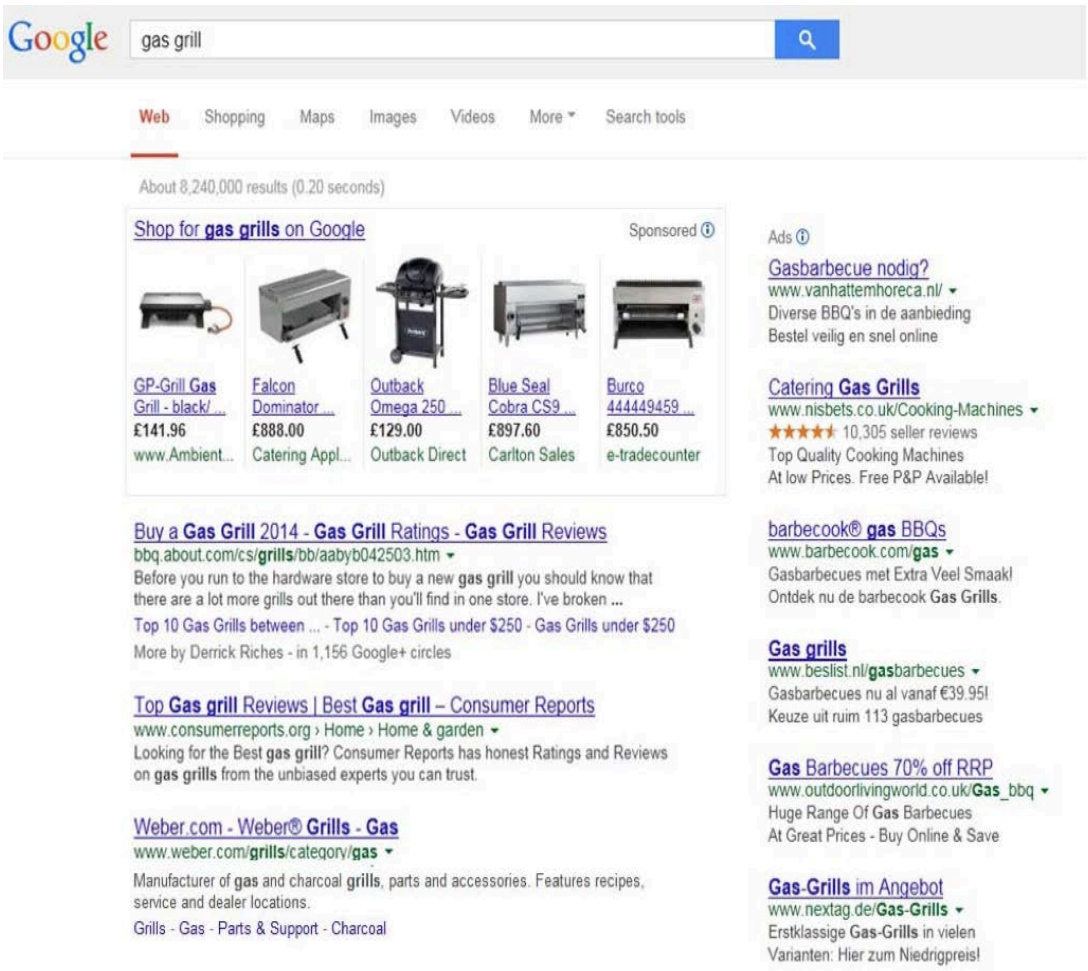
a) To no longer restrict advertisers from using and managing online advertising campaigns between rival advertising platforms.

Here below is possible to observe an example of how Google displayed its search results before the implementations and how it will show its results after the application of commitments.

a) Google page before the implementation:

   i. Shopping:

Figure 23

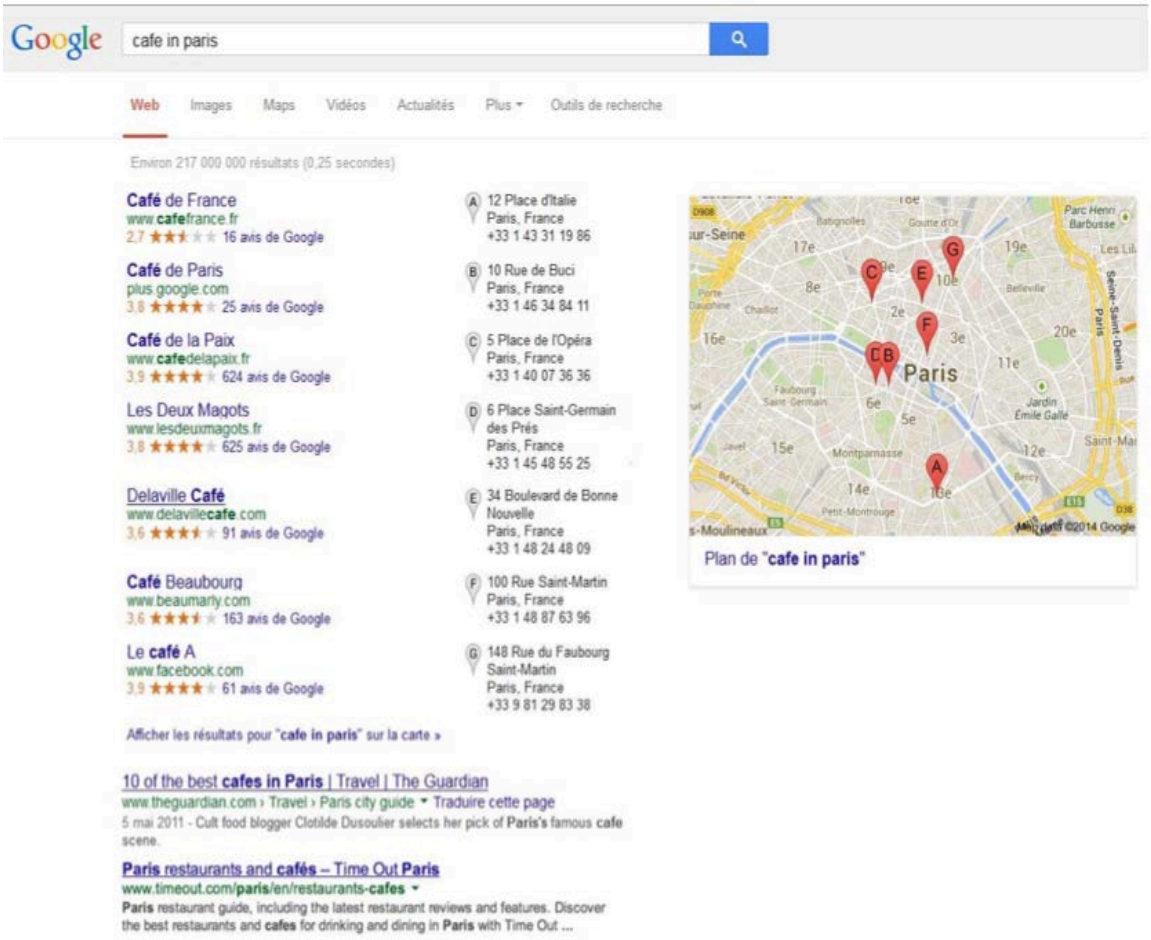


21

[21] Image 23 taken from (European Commission, 2014)

ii. Maps:

Figure 24



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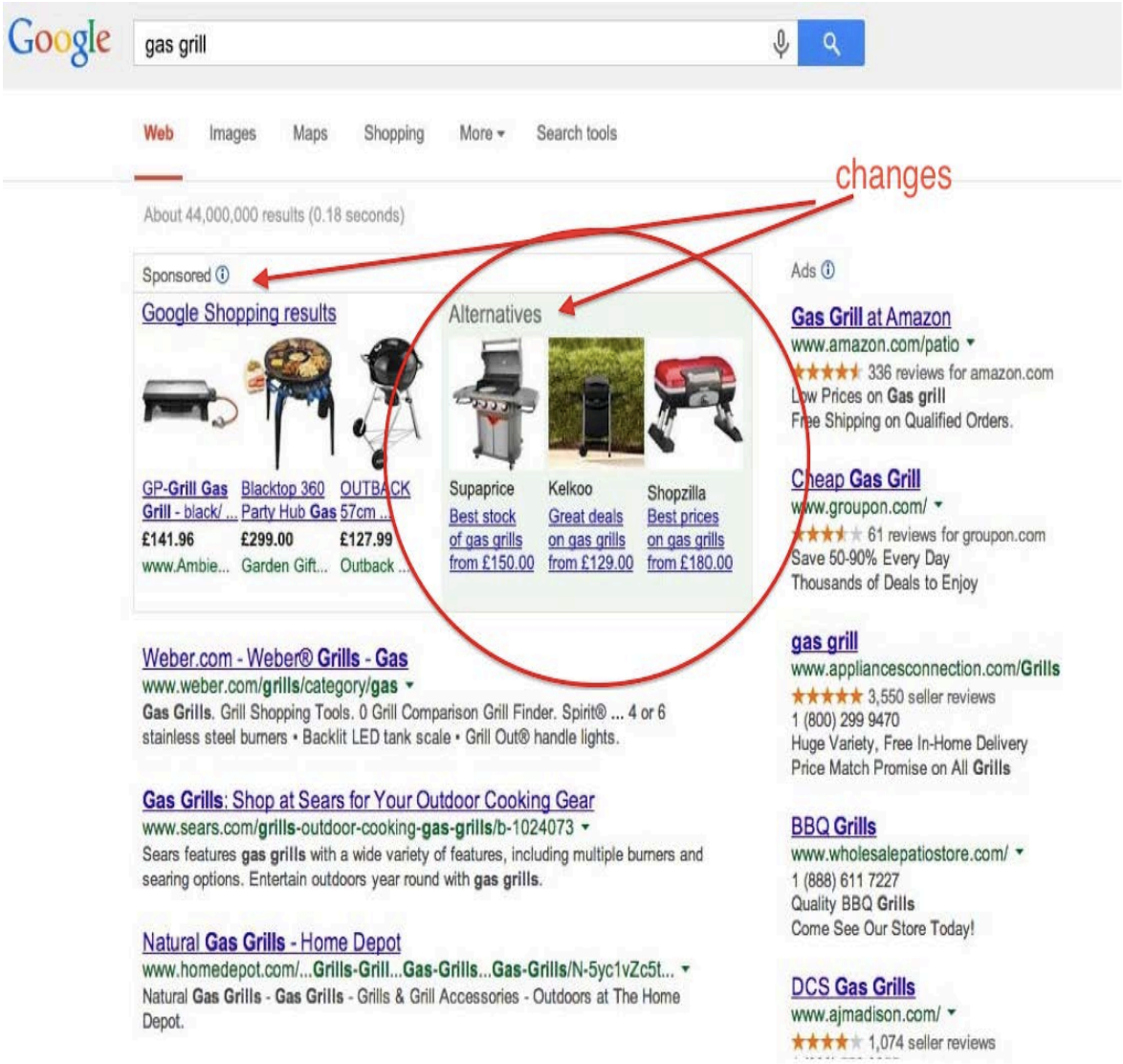
[22] Image 24 taken from (European Commission, 2014)

b) Google page after the implementation both for pc and mobile devices:

i. Shopping:

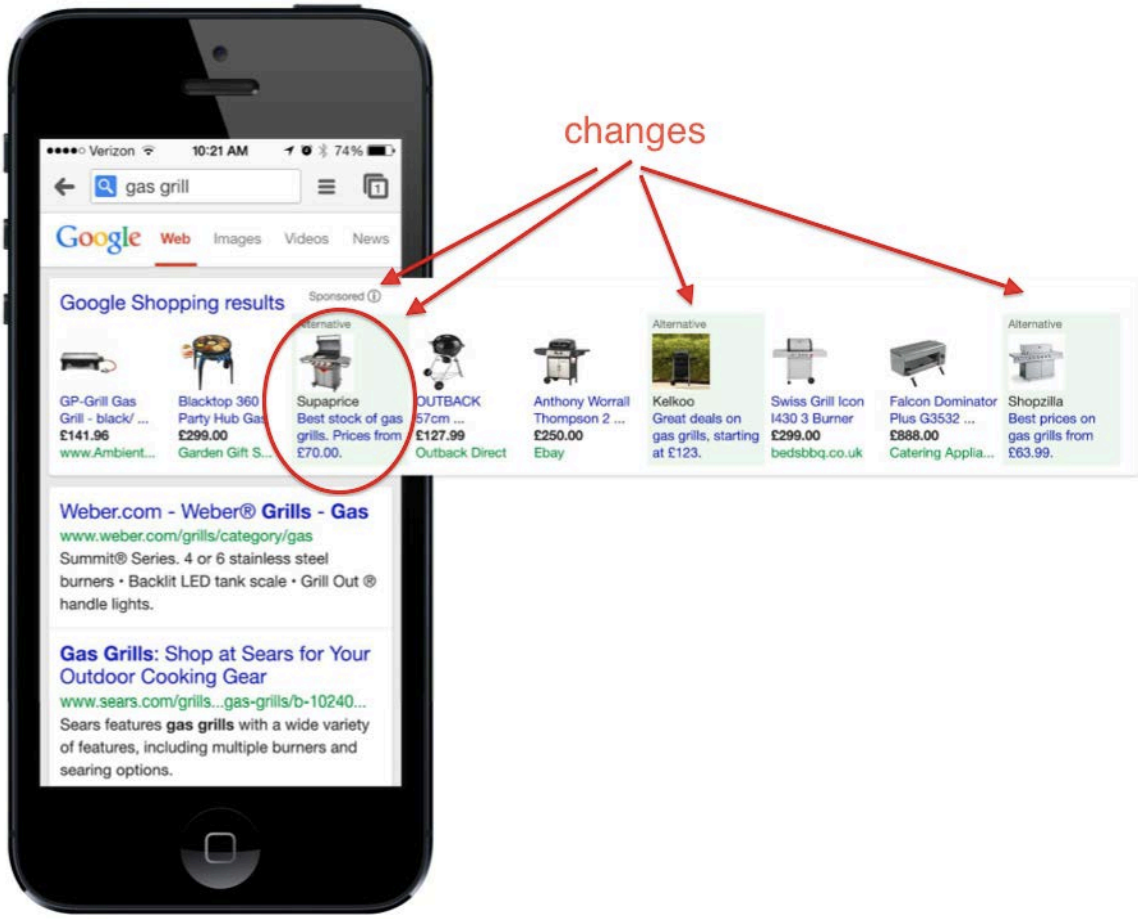
Figure 25



23

[23] Image 25 taken from (European Commission, 2014)

Figure 26

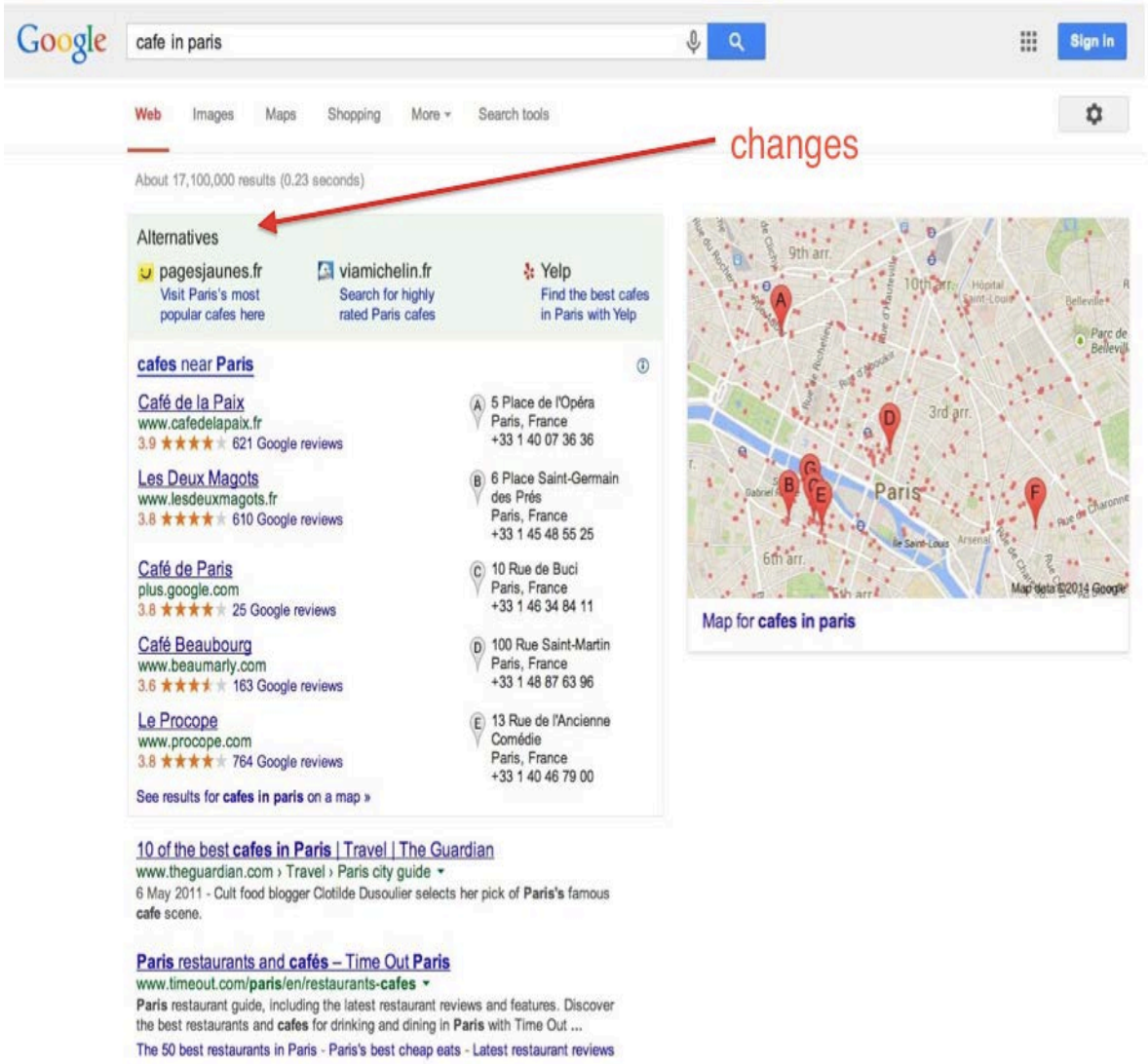


24

[24] Image 26 taken from (European Commission, 2014)

ii. Maps:

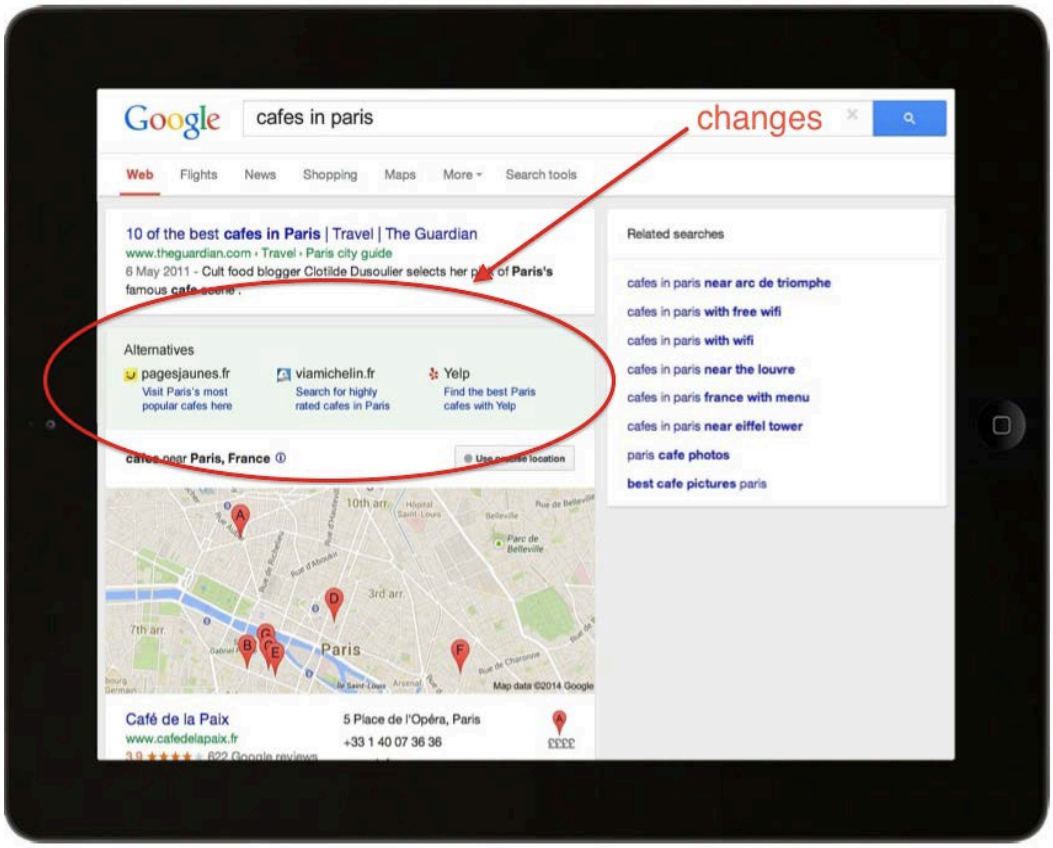
Figure 27



25

[25] Image 27 taken from (European Commission, 2014)

Figure 28



26

Following the above proposals, which would bind Google to implement them in the European Economic Area (EEA) for a period of 5 years under the supervision of a monitoring trustee, the Commission Vice President Joaquin Almunia, in charge of competition policy, argued that “the new proposal obtained from Google after long and difficult talks can now address the Commission's concerns. Without preventing Google from improving its own services, it provides users with a real choice between competing services presented in a comparable way; it is then up to them to choose the best alternative. This way, both Google and its rivals will be able and encouraged to innovate and improve their offerings. Turning this proposal into a legally binding obligation for Google would ensure that competitive conditions are

[26] Image 28 taken from (European Commission, 2014)

both restored quickly and maintained over the next years" (European Commission, 2014).

At the beginning of June 2014, the Commission has begun choosing the monitoring trustee that for the moment is being picked from a list of independent inspectors given by Google. However, if the Commission believes that none of the proposed candidates are suitable, it can appoint one of its trustees with the condition to be fully independent from Google (Fiveash, 2014). The monitoring trustee will control Google during the following 5 years sending reports on a regular basis, with a particular attention on how the new implementations in Google's specialized search services will work, and if they conform to the agreements taken in the commitments. As already said above, if Google breaches the agreements taken it will be charged with a fine up to 10% of its annual worldwide turnover. Furthermore, with the commitments of Google that are being made legally binding, the Commission has also stopped its investigation in relation to matters dealt with the commitments, but it does not mean that Google has any type of protection against further antitrust investigations regarding other matters.

Article VIII. DISCUSSION AND IMPLICATIONS OF THE EUROPEAN COMMISSION'S BINDING COMMITMENTS ON GOOGLE

The legal structure that the EU Commission has used for assessing the abuses of Google as a dominant firm is centred on Article 102 of the TFEU. As seen above, this Article prohibits dominant firms to abuse of their market power and hamper competitive firms' business. However, Article 102 doesn't limit companies from having a simple domination in the market where they operate, but restricts the use of this power for anticompetitive conducts. Thus, the EU Commission needs first to define the dominant position and the market power of the company that is being investigated, which in order to be dominant must be careless of competitors when taking decisions and free from competitive pressure. As in the case for Google, the market share over 50% is an underlying requirement to assess the dominance of a firm in an industry, even though in a market with rapid entry or very volatile is not sufficient. On the other hand, Article 102 does allow efficiency justifications of a firm that has dominance in an industry from being blamed of an abuse of dominant position. However, the dominant company must demonstrate that the efficiencies satisfy 4 conditions:

- Efficiency is accomplished as a result of the product concerned,
- Company's behaviour is crucial to the realization of these efficiencies,
- Efficiencies must increase consumers' value,
- No exclusion of competition from the market due to the conduct pursued.

As seen above, Google in Europe has more than 90% of market share, thus a very high market power, and specialized search services are the Google's practices that threat the most EU Commission because: firstly can make

competitors less visible to users, secondly can hamper the creation of future original material, and lastly can significantly influence the decisions of advertisers in using other ads networks and third party websites in using other online ad-tools. Therefore, the main concern of the EU Commission is that due to Google's practices, EU consumers might not benefit from other innovative services offered by competitors. The final settlement that has been approved last February 2014, Google has implemented changes that have successfully satisfied the Commission concerns, even though these settlements do not seem to be very effective in protecting customers, since the changes' results in the future are very hard to predict because of the fast evolution of the SE market. One of the most important changes that Google has made is the one to include also three other rivals in the specialized search services' results. This new way of displaying specialized results might not generate the Commission desired outcomes in the future, thus there is a lot of uncertainty also for Google's future practices (Hand, 2014).

Another important point is the level of dominance that Google has in the organic search. As seen above, an organic search is a free service that SE offer to users that in turn, with their queries, permit SE to have better information on their attitudes and preferences. Even though Google has a dominant position, it is not a Gateway to content on the Internet. With the evolution of the Internet and of web browsers, users have now additional tools such as browser bookmarks and history, auto-complete operations of PCs, customizable add-ons that link directly to a website and many others that connect directly users to content without the need for an intermediary like a SE is. Furthermore, Internet abilities and knowledge of users have increased exponentially in the last decade, leading to a greater use also of the URL bar when opening a web browser. The result of a research conducted in 2005 about the behaviour of a group of students surfing the web shows that the most used method of initiating a new task was by typing in the URL bar, with the

only exception for transaction purposes that were initiated from a browser bookmark. Furthermore, repeated tasks permitted users to navigate directly to the desired content with URLs, browser bookmarks or mobile apps (Melanie Kellar, 2006). Thus, Google cannot be considered as a gateway to the Internet, since a customer can avoid using it and directly access content. Another important aspect to consider, like also seen above, are switching costs of users between SEs: a part from few big players that are horizontally competing with Google like Bing, Yahoo!, etc.; vertical SE have grown exponentially in the last years by offering specific search to segments of online content. Moreover, searchers use more than one SE during their searches for a variety of reasons ranging from quality to user preferences, making Google not the only way to find information and to reach websites. Thus, at zero switching costs, users can change SE or/and directly reach websites. These implications show that Google dominance is just a matter of users' behaviour and usability of the Internet tools and that Google doesn't stop users from changing SEs at any time. Moreover, if a user is not satisfied with what Google offers it can easily switch to Yahoo!, Bing or other horizontal alternatives.

As said above, Article 102 of the TFEU does not forbid dominance, but only its abuse, meaning that Google can easily have 90% of market share in Europe and still maintain precompetitive behaviour. The Commission implication of Google's abuse of giving a preferential treatment to its own vertical services is not something that Antitrust Regulations prohibit. Displaying vertical search services together with organic results is a practice that also other Google's horizontal competitors do. Moreover, if users didn't appreciate the grouping of a SE's relative specialized search services together with organic results, then a SE that would only display organic search would quickly increase its number of users. Additionally, users could just scroll down the page and avoid specialized search services, and if not happy with the organic results easily switch at no costs to another SE. Concluding, Google has invested a huge amount of money to continuously satisfy users' needs with sponsored search,

organic search and lastly with specialized search services, thus if Google stops providing these services it would definitely lose traffic and consequently lower revenues from advertisers. Also, providing users both with organic search results and with specialized search services is a way to increase consumers' value, not the opposite, and most importantly no antitrust law forbids a business to promote its own innovations.

Instead, taking a look at the possibility that Google is abusing of its market power to exclude vertical search services from the market and increase its traffic and consequently its revenues from advertising is very important. Google's specialized search services can be seen as an improvement of its organic search that has begun with the implementation of "Google Universal Search", and it definitely reflects consumer preferences. As Microsoft stated when it first launched its own SE: "Bing is specifically designed to build on the benefits of today's search engines but begins to move beyond this experience with a new approach to user experience and intuitive tools to help customers make better decisions, focusing initially on four key vertical areas: making a purchase decision, planning a trip, researching a health condition or finding a local business. The result of this new approach is an important beginning for a new and more powerful kind of search service, which Microsoft is calling a Decision Engine, designed to empower people to gain insight and knowledge from the Web, moving more quickly to important decisions" (Microsoft, 2009), thus Google is offering a product to users that also Microsoft believes that can increase customers' value. On the other hand, if users instead did not like these extra services but Google continued to display its own specialized services with its organic search results in order to increase traffic and advertising revenues and exclude rivals, then it would definitely lose market share since users would switch to an alternative SE that does not show these extra services. Hence, Google would lose traffic from the organic search as well as from specialized search services, risking its business safety because ignoring consumer preferences in organic search.

Another important aspect to be taken into account when imposing on Google the commitments of the EU Commission above described is the innovative process of rivals. At this moment in time SEs are beginning to display more than just organic results, and Google, which is the most widely used in Europe, is able to deal with user queries beyond the basic need of a list of blue links. The EU final decision to impose changing in the way Google behaved and displayed results could harm other SE to invest in the future in new features and ways to address customers' needs, thus hamper their innovative process. By observing the Google case from this other side, it is possible to see that perhaps antitrust regulation is jeopardizing the innovative outlook of companies that operate in the SE market.

Instead, taking a look at Google possible abuse of market power in favouring its own specialized search services from the perspective of Essential Facility Doctrine is very useful. Under the EU competition law, three elements must be met for a company to be anticompetitive by blocking the use of a specific service:

1. "The refusal is preventing the emergence of a new product for which there is a potential consumer demand.

2. The refusal is not justified by an objective consideration.

3. The refusal will exclude any or all competition or will eliminate any or all competition in "a (secondary) market.

As it is possible to see, in order for a conduct to be anticompetitive it must satisfy all three elements at the same time. If even one of the above elements fails, then the doctrine does not apply. In the case of Google placing its own specialized search services as the first results to be viewed in an organic search result, thus not including other rivals, does not satisfy any of the three

above elements since no company has the right to be there together with Google and must earn the top placing in organic search by performing better than rivals. On this aspect, is in the interest of Google to give ranks and placements to links in its organic search as objective as possible, since biased results would lead to lower traffic, less targeted results for advertisers with a consequent reduction also in Google's revenue stream from this side of the market. Finally, users have many other ways to reach these vertical search sites a part from Google, and more importantly a high placement in specialized search results even if useful for a company, taking into account the way in which the Internet is evolving and how users are gaining expertise in surfing the web, is not essential for survival (Sidak R. H.).

Article IX. RECOMMENDATIONS TO REGULATORS AND FINAL CONCLUSIONS

In this paper have been analysed many issues beginning from the evolution of the Internet structure until the first case of search neutrality. The Internet as it is known today is evolving in the direction of the Internet of Things, which will completely change the way people live and interact. As it has been also seen at the beginning of this paper, the structure of the Internet is moving to an Hourglass-shape structure, with the waist that is going through poor radical innovations and the sides that are being innovated heavily. In this sense, the waist should be kept as simple and efficient as possible in order to permit an effective flow of data. By observing the lower side of the hourglass is possible to see that ISPs are trying to obtain the freedom to operate as Gatekeepers and perform a minimum level of discrimination over the flow of data in order to

have more efficiency. On the other side, regulators, IAPs and ICPs are fighting for a neutral Internet with a free flow of data and with no discrimination. However, it is important to point out that the Internet has never been neutral; discrimination by ISPs has always been done, as explained in this paper. Thus regulators are not protecting a fundamental characteristic of the Internet, but rather are trying to change it. In the middle there are the CDNs, which have managed to change the way data flows from the physical layer to end users and have also influenced the way ISPs operate. In fact, CDNs are performing an intermediation task by delivering content of ICPs to the last mile through cache servers, operating on multiple ISP platforms and avoiding passing through the entire network for every user request. In this way CDNs bypass the network and easily reach the final users due to direct connections. In this way ICPs can pay less and CDNs perform the useful activity of increasing performance of the Internet since reduce the use of long-distance networks. At the same time, large ICPs like Google, are integrating vertically creating their own CDNs, thus reducing backbone costs, and establishing partnerships with private network providers. In this way, a huge part of the Internet traffic avoids the core Internet networks and ISPs mainly, enabling a greater smoothness of the entire system. Furthermore, ISPs are now emerging also in the CDNs' market, by integrating in their already established networks CDNs to obtain higher revenues. Thus, the CDN market has created for ISPs and large ICPs new business opportunities, innovation possibilities and the delivery of new services. However, the implications behind the use of CNDs are massive from an antitrust point of view. With their emergence, ISPs have begun searching for alternative ways to satisfy ICPs' demand and compensate the loss of traffic caused by the use of CDNs by large ICPs. A possible way in which ISPs can solve these problems is by discriminating data flow and offer higher QoS to IP packets of ICPs that agree to pay more. However, in this way there would be a part of the Internet traffic that would receive a lower quality of service, undergoing a discrimination practice that goes against net neutrality

principles, which are being in this moment revisited by FCC in USA and BEREC in Europe. Hence, by taking a step forward, the evolution of the Internet is moving in a direction where discrimination practices can emerge also in other parts of the Internet, not just in the physical layer, creating not only net neutrality problems but also search neutrality, cloud neutrality, application neutrality and to platform neutrality ones.

Actually, it didn't take much before a problem of search neutrality came out in the intermediation of information industry, with Google suspected of abusing of its dominant power, both in the USA and in the Euro area. Yet, in this case, the conduct investigated by EU Commission is based on the fact that Google gave priority to its own specialized search services over the ones of competitors, it used third party original content without sharing a part of its revenues and without permission to take it, it obliged advertisers to use only its AdWords platform and not competing ones, and lastly imposed on third party websites to use only its own advertising channels and not the other ones with the risk of lowering their PageRank. The settlement of the investigation, as opposite to the Microsoft case, didn't end up with a big fine, but with a commitment of Google to implement precompetitive changes for five years. However, from the Commission final results, it seems like improvement in customer value and protection are not substantial but could rather be negative if other search engines in the future do not innovate because of the possibility that antitrust regulators step in. In fact, the evolution of the Internet and the web, thus with the IoT and web 3.0 or semantic web, will require search engines to perform additional activities other than the simple organic search. The way Google, for example, shows its search results in general is just the start of how results will be displayed in the future: their quality will improve and the type that will be given to users will increase. Moreover, antitrust laws do not prohibit companies from advertising their own innovations and discrimination made by Google was not foreclosing an essential feature for the

soundness of rivals' businesses, but rather a useful one, which is a totally different matter. In order to face a fast growing market as it is the search engine one, with high entry barriers, due to high fixed costs but low average costs, and with few big firms operating, antitrust regulation should follow a very careful and balanced approach, taking into account also the error-cost framework in order to reduce Type1 and Type2 errors. On the one hand, regulators need to understand that without search engines the current widespread and accessibility of information would not be the same and the Internet would be very less useful than it is today. Furthermore, since the search engine environment is based on increasing capital management activities as well as innovation activities, any antitrust directive should take into account both aspects. On the other hand, it is impossible that a leading firm will not use its market power to increase its revenues in some way, thus the absence of antitrust supervision will for sure harm both users and advertisers. Thus, the aim should be to increase transparency (e.g., PageRanks and algorithms made public and open), increase the quality of the search results and limit benefits from anticompetitive conducts, as well as maintaining the incentive of firms to innovate. Ultimately, as already seen above, search neutrality could be a principle to refer to when dealing with organic search, specialized search services and sponsored search results problems, although difficulties for regulators in this field are numerous: from the complex and fast-changing structure of algorithms used by search engines, to the actual fast-growing and highly innovative environment where they operate in. As it is possible to see, regulators must be careful in not hampering innovative incentives of firms operating in the search engine environment by punishing the exploitation of innovative products, which do not understand completely, as anticompetitive conducts. Nevertheless, at the same time they must oversee and punish any change in conducts or in different uses of algorithms for anticompetitive reasons.

As it is possible to see, discrimination that ISPs can make can really decide the survival of IAPs and ICPs: for example, Google could not be able to deliver its services to end users with discrimination of an ISP and consequently lose traffic and revenues depending on the level of discrimination. On the other hand, the hypothetical discrimination done by Google, since its algorithms are still secret, is just based on consumer preferences and the way they retrieve content. Hence, users could easily reach content with the URL bar, browser bookmarks, mobile applications and many other ways that really make search engines obsolete if they would just deliver organic results like ten years ago. Moreover, Google as also seen above, like other large ICPs, is also integrating downwards, thus replacing in certain areas of the Internet the need of ISPs, with their own CDNs. This implicates that the traditional hierarchy of data flow, has seen at the beginning of the article, will change into a more complex model since ISPs are finding new ways to interconnect in all the parts of the Internet. However, if discrimination done by ISPs by offering higher QoS is treated as an anti-net neutrality conduct, thus punished by regulators; the same cannot be said for CDNs' practices, which are not considered to disobey net neutrality principles. Essentially, the goal and the result of CDNs is the same as the one of data prioritization done by ISPs: provide a higher Quality of User Experience and deliver in a quicker way particular content. Yet, the CDN since are not overseen by regulators could lead to competition problems in the rest of the Internet ecosystem: huge ICPs, like Google, for example, could use their CDNs or other content-quickening facilities to enhance the quality of service given to customers, thus increase traffic inflows and consequently revenues from advertisers, since would value even more the ICP networks. The results would be that ICPs that cannot pay more for CDNs or ISPs' higher QoS options could start loosing traffic and not be able to compete with the other big players in the market. Hence, anticompetitive conducts would start to take place, with ICPs that already are dominant in their market (both/either horizontal and vertical) that would provide the majority of the Internet

content, backed up by their CDNs and/or ISPs that deliver for them content to end users through preferential pipes, and smaller ICPs that would be forced either to join the bigger ICPs or to exit the market; leading lastly to an oligopoly type of market (MANUEL PALACIN, 2013).

From this prospect, if Net Neutrality debate has still not reached an end, and is far from being solved with the emergence of CDNs, new neutrality debates are starting to emerge at higher layers, where huge ICPs that are not only operating in one market, but also in many niche markets, discriminating both horizontally and vertically, and expanding also in other layers like it has been discussed above. In this sense, Google can be seen in this moment as the biggest ICP operating in multiple Internet layers: firstly has successfully expanded into niche markets that did not cover few years ago, and secondly has begun to deliver content to users (like for YouTube also) through its own CDNs (i.e. has already began to bypass the network, giving a higher quality of service). The investigation of the European Commission on matters discussed above can be seen as just one of the slightest discrimination that Google, or any other similar ICP, can perform in the future. If the Internet is evolving in a way in which individuals among them are more interconnected, also neutrality concerns are evolving in a way that it will not be only one market to be affected, but many markets at the same time and more Internet layers at once. Thus, Antitrust regulators should aim at creating regulatory frameworks that have a high level of flexibility and transparency aiming at regulating platforms, not conducts, in order to adapt to fast growing industries and to innovative firms, which will use increasingly more complex technologies that will be much more difficult to analyse, operating in more than one market and in more than one layer, in order to protect consumers and guarantee precompetitive business environments.

Article X. REFERENCES

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