THEORY ON DEMAND

IPPOLITA

THE DARK SIDE OF GOOGLE

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The Dark Side of Google

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PRE-AFTERWORD - SOCIAL MEDIA TIMES

Performance Societies in the Clouds

Many years have passed since Ippolita first addressed the need to distinguish between the Free Software movement and the Open Source movement. Although both movements are associated with a certain 'freedom', the 'freedom' proposed by the Free Software movement is very different in nature from the 'freedom' proposed by the Open Source movement. The former is more ideological, whereas the latter focuses on defining the best way of promoting a product in an open manner, or in other words: it completely follows a market-logic. The Open Source movement has adopted the playful attitude of the hacker peer sharing and uses it in a profit-oriented logic of work and exploitation. In so doing they have neutralized its originally revolutionary potential.

The subsequent analysis will show that Google, which is a hegemonic attempt to organize 'all the world's information', progressed in a similar fashion. It will address how the logic of Open Source, in combination with the Californian philosophy of academic excellence found in Google's motto 'Don't be evil', is merely an excuse to place itself under the banner of capitalist abundance, the turbo-capitalism's illusion of unlimited growth and extremist anarcho-capitalism. They are selling the myths that *more, bigger and faster* always equates with *better* and that the 'I'm-feeling-lucky-button' will immediately and effortlessly satisfy all our desires with a simple click of the mouse. In other words: it creates the comfortable illusion that you will be taken care of if you create a Google account, and that there is nothing more that you will need.

Unfortunately, this claim of informational totalitarianism is not as ridiculous as it may sound. Although it has been established many times that there is nothing *more* to produce, and – more importantly – that unlimited growth is a chimera (even in the digital world), run-ups of the next useless and shiny gadget continue to appear. Our weary world could use the blow that the uncomfortable knowledge of limited growth would bring. We need to start looking around, looking at each other and exchanging what we need. We have to imagine and build something meaningful together.

We also have to understand that IT is not merely a technique to manage information in an automatic way. IT is increasingly seen as the panacea for solving social problems (from delinquency to the crisis of traditional politics). In fact, the *automation* easily degenerates in the delegation, sliding very quickly from a technical register to a social register. Instead of offering precise tools to solve specific problems, it becomes a universal medicine, which presents itself as working regardless of human intervention and will. However, society and sociability, such as politics and power management, are not problems to be solved once and for all: they are constitutive elements to face and to deal with to give a meaning to existence. This shift occurs because of IT's inherent logic, cybernetics, as being based on a system of retroactive adjustments: the effects generated by the adoption of a particular technological tool directly influence the very perception of the surrounding

environment, physical, social, psychological. The cybernetic IT systems reshape continuously its very foundations and turns into ideology by technology that was. To illustrate this, you can think of how Google uses this recursive logic as an extraordinary machine that is constituted by its own use by users. In this sense IT can be seen as an 'autopoietic' complex of machines which accumulate all the basic information entered on the Web by millions of users every day. And it is not only Google that uses this recursive logic; Facebook, Amazon and Apple are also exploiting these exact same processes.

When these 'mega machines' – consisting of a datacenter and the very best coders – had only just started to emerge and after they had safely been locked up by an NDA (Non-Disclose Agreement), one of the first problems they encountered was that they had to be filled with something. The content did not matter much, as long as the costs would remain low and if possible for free. A new and relatively cheap type of industrial production was born, yet the question became how these databases could actually return fabulous profits for their owners?

Around this time the Net had already emerged. Slowly, broadband connections were becoming less asymmetrical (mainly due to investments and the incentive to connect and bridge the digital divide, which meant a loss of the public sector), rates were down (although remaining unjustifiably high) and the upload capacity had significantly increased. Consequently, it was at this point in time at which the solution to all problems concerning the earlier mentioned mega-machines was revealed: the datacenters could be filled by pouring online the contents of users – all the data they had assembled on their computers, smartphones and cameras. This solution meant that the 'free market' was introduced: everyone would finally be able to publish! This led to the birth of a new myth, namely to the false promise of unlimited growth in the Era of User Generated Content. The ideology of this era proposes that the margins are huge, that the process of 'webbizations and cloudization of everything' has only just started and that its prospects are fabulous. The 'cloud' of cloud computing can increase by many orders of magnitude.

As a result, what we now face is one of the most effective Weapons of Democratic DistrAttention that has ever been developed: the administering of gratification for users who cannot wait for posting, tagging commenting, and linking not only to their own photos, videos, tweets, texts, but also to those of their friends in the great mare nostrum of social networks. However, what is often forgotten is that this sea is actually not at all nostrum ('ours'), since it is almost always in someone else's place; whether that'd be Facebook, Flickr, Twitter, or the next digital aquarium to entertain and nurture net-fish. We are happy and glad as long as we possess the latest expensive tool for self-denunciation and as long as we can always be online and connected. Soon we will all make our purchases with some 'smart-stuff' – thereby forgetting credit cards – because we always want to know what we are interested in, what we like, what we think, where we are, what we do and with whom. And since the devices are getting smaller and less capacious, it has become easy to predict how an explosion of the storage of personal data online will take place.

From the File to the Cloud: *'If we want things to stay as they are, things will have to change'* (Il Gattopardo – The Leopard)

Today, web applications are able to replace almost all software that has ever been created for the computer. The very idea of a personal computer has ceased existing now everyone is able to have his or her own personal web space. Ten years ago users were still struggling to understand how to manage file systems; today, users are completely unaware of how they are under the thumb of the dispersion of their contents online.

Hardware devices now almost exclusively serve to provide access to the Web and its services. As users we do not 'own' anything, because everything is shared with the large corporations that provide us with services free of charge. For the common user, the computer as a physical entity has faded in the impalpability of *cloud computing*. Like Olympic Gods, the informatics of domination which rule our lives stay in the clouds. This 'evolution' reflects a precise technical and economic goal, namely, that the Web has to become the main environment for IT development. Key elements of this evolution are *cloud computing*, the smartphone, tablet, e-reader (or mobile devices in general), browsers, HTML5, and social networks.

One of the most interesting innovations associated with mobile devices and the Web in general is the disappearance of the concept of files and file systems. On desktop systems we have gotten used to working with folder and files; our documents are files, images are files, and all of these files are organized in folders. Often the links between different types of files and applications are very clear: a word processor creates, displays or edits textual files while an image viewer handles image files.

However, for mobile devices with access to content on the Web this organization in files and folders is close to meaningless. Instead of speaking of files and folder these devices speak of services or features. This development is undoubtedly interesting and not devoid of a dark side. The example of what happened to music files is perhaps most evocative. In a desktop environment – before the birth of applications such as iTunes – audio files (often with confusing names) were often placed in folders or collected in a playlist. Music programs read these audio files or playlists and in so doing allowed us to listen to the music. With the birth of programs (capable of self-generating playlists and music libraries and categorizing audio files into virtual folders, collecting them by author, year and album), however, the 'file' for music has disappeared. Once uploaded on the device, music ceases to exists as a file (for the user at least) and it ends up inside the blob of the mysterious music libraries from programs such as iTunes.

The next step was the online audio library with which it is no longer needed to download audio files via p2p networks (thereby often committing 'cybercrime'), because applications now offer us everything we want to listen to directly on the Internet. All libraries and all content are available without any control and there is no need for files anymore that are actually stored and catalogued on your device. Examples of these online audio libraries are Spotify and Grooveshark.
This loss of 'stored' files in online audio libraries also extends to most other types of files; pictures and videos are immediately uploaded on social platforms, and textual documents are stored in

office suits that are accessible online by different services and for which you no longer have to install any programs. The *cloud* offers services, space, sync, the myth of the 99.99% uptime – basically everything that our devices cannot 'physically' have unlimitedly and almost always for free.

Cloud computing is trivialized in a series of buzzwords, such as SaaS (Software as a Service), DaaS (Data as a Service) and so on. It has in fact become the very virtualization of a 'feature' offered as an online service. Everything is up and run somewhere in the clouds of the web and ready to be used. Everything changes so that nothing changes. While the way in which we make use of data has changed drastically (think of the amount of data we are handling, its quality and the devices with which to access these Big Data), the main managers of these clouds are still the usual suspects: Google first and foremost, but also Amazon.

However, besides making use of *cloud computing*, Google has also entered the competition in mobile devices. The advent of smartphones and tablets with Internet access has revolutionized the mobile market and it gave birth to a new mass ritual, namely the 'Connectivity Everywhere' with the mantra 'Always On!' The smartphone has become a status symbol to the point of unleashing wars for the hegemony of the market and together with IOS, Google's Android has emerged as one of the major competitors.

Android is an operating system built on a Linux kernel and distributed under the open source Apache license. Note how we use 'open' and not 'free', because actually, the FSF GNU's components and libraries used by GNU/Linux OSs have been replaced by BSD-based ones. Android has been chosen by several hardware manufacturers and is therefore available on different models that often compete with each other. It could thus be argued that Android has become a *de facto* standard, in a similar way to how the Windows operating system for desktop became a standard. The only basic difference is that, thanks to the open source license, manufacturers can create custom flavors of Android for their hardware. Along with the operating system Android – and in addition to having acquired the manufacturer Motorola – another important element of Google's entrance in the mobile market is its own specific smartphone, the Nexus. In contrast to Android, IOS forms a proprietary and closed operating system. It was specifically designed by Apple for its mobile products the iPhone, iPad, and iPod.

Then, besides numerous and frequent legal battles over patents, the scenario in the mobile market is further complicated by the joint venture Nokia-Microsoft with Windows Mobile, and also by the former leader of the mobile market RIM, that continues to plod with Blackberry. Also, one of the most representative examples of an Asiatic gigantic corporative capitalist is the aggressive Samsung. This Korean company has begun the most profitable electronic conglomerate in the world, which for a large part can be attributed to their tablet and smartphones using Android. Finally, Chinese players such as ZTE and Huawey are also gaining a foothold in the war for the hegemony on the mobile market.

Bearing in mind this strong competition that surrounds the mobile market, it is easy to understand the importance of the browser instrument as an environment for development. Google released

the first version of its Chrome browser in 2008 and was early enough to catch the trend that would soon become dominant: Web services. Once again, Google found itself in the lead position.

Unlike Mozilla Firefox, whose innovations are for a large part linked to the methodological structure of the work and to the cultural heritage of Open Source, Chrome contains only technical innovations. As sons of the Californian turbo-capitalism, Page and Brin staked everything on speed. The result in Chrome is a phenomenal JavaScript engine and the division of each web page loaded as a single running process. In contrast to other web languages, JavaScript describes the 'logic' of the sites and applications. The better its performance, the greater the speed of execution of the service we are using.

HTML5, W3C: standards, architectural dominance and control methods

In the highly complex world that the Internet is, some elements need to be shared in a manner as universal as possible. In order to make the computer processes communicable and communicating, common rules, conventions and alphabets were necessary. This is why over the course of years standards have been established. Think of the HTTP protocol born at the end of the eighties, which enabled machines and humans to access the Web. Without HTTP, the World Wide Web would not exist and – although many are eager to innovate – no one has the slightest intention of changing it. Not even the nerd supremacists in the Silicon Valley who are on the payroll of the most visionary anarcho capitalists.

This is in sharp contrast to the changes that have been made in the HTML language (essential for web pages) and which has become a ground on which some of the most important battles for architectural dominance of the computer world were fought (but not won). The evolution of HTML is managed, along with other basic standards, by the W3 Consortium, which is one of the supranational institutions responsible for making suggestions and recommendations on what the Web should be like.

The W3C tasks are organized in different working groups. Each group makes drafts of specifications and recommendations for each individual project. To become a recommendation, a draft must have at least two independent (meaning no code is shared) implementations that are meaningful, fully functional and already used by a considerable number of users. It therefore depends for a large part on Google whether a HTML5 or other specific recommendations will become W3C standard. However, it should be noted that Google develops its Chrome browsers on the same WebKit rendering engine that is used by Safari, which is Apple's proprietary browser. Google is also the main funder of the Mozilla Software Foundation, which develops Firefox that is based on the Gecko rendering engine. Now that the Opera browser has switched to WebKit, Gecko-Mozilla remains the only alternative together with Microsoft's Internet Explorer to implement new standards.

This quick rise behind the scenes of the Web is a short example of what Ippolita means by the analyzing of technocratic systems on which informatics of domination are based. From the moment that (mobile) devices have multiplied, laptops have been emptied of software and data, and the craze of everything 'social' has exploded, it is easy to understand how browsers and HTML are of

primary importance for the building of a worldwide computing hegemony – both from an economic and political point of view.

Open is not free, and published is not public

And here we are today. Unlike the times in which Ippolita was one of the few shouting over how we don't have to put everything on Google – because the delegation (even if semi-unconscious) marks the beginning of the domain (in this case, technocratic) – today many voices have been raised against the social networks and the whole web 2.0 tale, and they accuse it of violating the privacy of users.

The techno-enthusiasm is dismissed as a false revolutionary ideology, because however social the Internet as a movement may appear, this is overshadowed by its elitism: how contradictory and fideistic! Commentators like Danah Boyd point out how Facebook in particular is a project based on the ideology of *radical transparency*, because it is in its nature to strive for publishing everything indiscriminately. It should not be forgotten, however, that Facebook's first venture capital financier that came from the Paypal Mafia was intertwined with the military and civilians intelligence services, offering political support to the USA right-libertarians (e.g. people who believed Bush Sr. to be a 'moderate'). As Tom Hodgkinson already commented in The Guardian: these are people who define themselves as 'anarcho-capitalists'. Umair Haque even dares to notice, from the privileged surroundings at Harvard, that perhaps the 'bubble' of social media also exists from an economic point of view: so far no one has shown that these social media have added anything to the selling of customized products through personal advertising. In the meantime, various scholars have accomplished more extensive pieces of analysis and criticism. We just remember the thorough *The Googlization of Everything - and Why We Should Worry* (University of California Press: 2011), by Siva Vaidhyanathan. Evgeny Morozov's *To Save Everything, Click Here* (Public Affairs, 2013) has rightly focused the debate on *solutionism* and *Internet-centrism*, fideistic acceptances of the so-called inevitable 'technological revolutions' in place. These attitudes claim to be scientific and objective, but instead are highly ideological, endemically spreading now in too many private and public speeches. But it lacks a broader theoretical discourse on power and socio-power, based on the practices of technocratic delegation that users perform in everyday life.

Beyond both concrete and rather unrealistic proposals for the fighting of this social media bubble (e.g. mass 'suicide' on Facebook, the failed Diaspora project to rebuild a social network for free, complaints and petitions to various authority figures and guarantors who are unable to even supervise themselves), it is actually someone like the techno-enthusiast Jeff Jarvis who puts the finger on the problem: the public. Similar to how 'opening a code' does not equate to 'making it free', 'publishing content' does not equate to 'making it public'. On the contrary: continuing with the example of Facebook (although G+ or other social platforms work in the same way) it becomes clear that it actually works the opposite way. Everything that is posted becomes the non-exclusive property of the company. This means that it can be resold to third parties; you can (re)read this in the TOS (Terms of Service). In the clouds of social networks, then, published does not mean public. For almost all web 2.0 applications published means 'private'; a corporation or a private company owns the content. Each time we access our online profiles (our digital alter egos) we work for

these corporations for free. By serving us with increasingly invasive and accurate advertisements, their algorithms try to make money on our back – on our digital bodies.

Ippolita's harsh considerations on Google's totalizing ambitions seem all the more urgent when we consider the case of Facebook. Yesterday's champion in 'invasiveness', Google, almost pales in comparison to the champion of social control today: Facebook. The way in which Gmail uses advertising, the power of geolocation in Gmaps, the successes of Chrome as a browser and of the Android OS, or even the most controversial projects, such as GoogleBooks which has stunned the entire publishing market, seem almost harmless when compared to the capacity of Facebook to expand a consensual method of social control. After all, Google is an Enlightenment dream; a dream of global knowledge characterized by politically more liberal than conservative tendencies. Facebook, on the other hand, of which we still expect consistency beyond the interplanetary gossip, has a political connotation that is clearly reactionary. Ippolita wrote extensively about Facebook in *Nell'acquario di facebook*, to be translated en published in English as *In the Facebook Aquarium.*

Of course we should not forget how networks have played an important role in the 2008 revolt in Iran, and in the uprisings of most countries in North Africa, as well as in the Arab world in general and in Asian dictatorships. Facebook has been very helpful for the Indignados, and Twitter and FourSquare for Occupy Wall Street. These and other private instruments will probably be used again in the revolts for freedom that are yet to come and we hope that they will be more and more numerous. However, this is not a good reason to link social networks to democracy, freedom and equality. Social networks do not make revolutions – it is people who make them. As the controversial WikiLeaks case and the Anonymous cases have clearly shown: if they want, governments and established powers may stifle any initiative branded as subversive, especially when it comes to matters of direct action that are strongly dependent on digital technologies.

The social networks are not necessarily free, autonomous and self-managed. We use them and create them to try to expand the possibilities of autonomy, but we cannot truly think that for-profit companies provide free of charge tools to access a world of freedom and equality. The use of technologies depends on the people. In itself, no technology guarantees anything. The methodological approach that we have practiced so far suggests that we should evaluate not the 'what' but the 'how'. That is, the way in which technological tools are created and modified through use and the methods by which individuals and groups adapt and change their behavior. It seems clear, then, that the same reasoning applies to social networks as to any other social value: the necessary consistency between means and ends. We are facing an anthropotechnics turning point.

The situation is critical. However, this story is not a new one and we are not at hazard in this situation. Following discussions on the technological word, from the iPhone to the iPad, from Android to Windows 8, from Facebook to Twitter, we have to laugh at the ingenuity of gurus, enthusiasts and ordinary users – a bitter laugh, from Italy. In this country it has always been clear that it will not be the so-called democratic institutions that will guarantee our rights. Nor will it be the machines of this or that multinational company with the consecrated status of Goodness

and Progress for All that will give us, free of charge, a world of freedoms. Italy continues to be the political laboratory of the future; it is the only Mediterranean country in the G8. Here in Italy, a movement that started online on a private blog has won a quarter of the electorate in 2013 and it now proposes itself as a force for renewal, much in line with the new Digital Movements that have the major vocation of claiming to represent the 99% (Indignados, Occupy Wall Street, Pirates). The politics are already a technocracy and proposals for technological democracy, the Web 2.0 or what have you, are increasingly enmeshed with this technocracy. Who are those who create and those who manage these democracy tools? Are they the nerd supremacists on the payroll of anarcho-capitalists? How could repentant military, technocratic geeks or whistleblowers constantly on the run inspire the struggle for freedom? The sad stories of oppression suffered by Manning, Assange, Snowden and many others, otherwise similar, are only the first chapters in a saga that promises to be detrimental to civil liberties. The technical skills and the geeks' enthusiasm by themselves are not enough to 'do the right thing', because deliberation, morality and aesthetic are not technical matters: the better algorithms will not automagically create better societies, and the radical transparency is a totalitarian nightmare.

Participation Myth Corollaries: We Are the 99%

Digital activism could be framed as interesting corollaries of the online mass participation myth, and the Social networks Fueled Revolutions are part of this same narrative. Of course people use what is available to them to communicate, and Facebook and Twitter and Foursquare have been very important tools for movements as diverse as the Arab Springs (Egypt above all), the Indignados (Spain) and Occupy Wall Street (USA and elsewhere). However, we would like to emphasize an aspect of these movements that relies more on ancient rituals than on the 'digital networks connected' rhetoric.

Ippolita shares the idea that '[s]ocial Media have been chiefly responsible for the construction of a *choreography of assembly* as a process of symbolic construction of public space which facilitates and guides the physical assembling of a highly dispersed and individualized constituency.'[1]

The key question is how these media were used to 'get physical'. How, in the modern theater of social Internet, do various technical layers contribute to social performance? How do so-called leaderless movements distribute power by channeling individual emotions in a collective emotional choreography? These self-called leaderless movements hide the importance of organization, and have now increasingly become an emotional management. However, the true leaders of social networks are the technical managers, because they can control the information flow. Technocracy is here. The choice for a specific communication platform is not neutral either. The main communication platform of the aforementioned Italian 'Five Star Movement' is hosted on the private, individual blog Beppegrillo.it. Technical procedures to be posted and shared are the key to power articulation in these kinds of digital movements, as was shown by the insistence of the German Pirate movement on *liquid feedback* tools of interaction.

1. Paolo Gerbaudo, Tweets and the Streets, Pluto Press, London, 2012.

We are certainly not the only ones to proclaim the notion 'what is true today, was true yesterday'. You must be able to imagine your future in order to understand the present. We need to be more contemporary to our times, that is to say *untimely*, or in the words of Agamben: 'contemporary is the one who receives in the face the beam of darkness that comes from her time'. By recalling the past and creating a collective story (since the memory is a collective tool), nothing is ever repeated. However, the differences are similar and the insipid soup of yesterday, a little pimped up, may be dished up as a radical innovation of tomorrow.
For this reason, we leave intact the escape routes identified in Chapter 7 of this book. Although things have changed, we want to remind ourselves of what has happened. For example, the logic of the trusted network that we identified in FOAF (Friend of a Friend) was realized in a different manner and eventually publicized by Facebook, Indymedia has run its course, and the dreams of digital democracy are embodied in new movements. If what we 'imagine' is reflected by the advertising on TV or on other devices, or by the 'freedom of choice' for hundreds of thousands of apps for the iPhone, or by the possibility of having more than a thousand 'friends' on Facebook, then maybe we have insisted too little on the need to desire and imagine something better. Yet some alternatives to Google already exist; think of self-managed servers like Autistici/Inventati, Riseup or Lorea. Of course, they are not *free as in beer*, but they are *free as in freedom*. Treading the never-ending paths of freedoms may cost a lot, but at least you have a choice and it allows you to undertake that what you desire.

So far we have described what Donna Haraway called the 'informatics of domination'. The method that has been built (cartographic, interdisciplinary) is necessarily partial and sometimes lax, but at the same time it has allowed for the problems with the technocratic delegation to emerge, long before it became obvious. Jamaican slaves used the saying 'Pull a straight lick with a crooked stick'. We like to imagine escape routes and try to sell them; we imagine and build appropriate tools to achieve our desires. We should make them available to an audience that is made up of people instead of publishing them through the deprived megaphone of an intrusive corporation's Wall. It is as McLuhan already claimed: 'the medium is the message'.

Many of us are in the same situation; we are not cooperating since we don't want to participate in the crowdsourcing of the masses of social media. The social networking services have the compulsive urge to touch up your profile in such a way that it will stand out from the others. However, these 'touch ups' are not real differences; they are only slight variations within predefined categories (single? married? friend?). This has resulted in the formation of groups in which we are friends because we say that we like the same thing, or in other words; it has resulted in a homophile self-imposition. Diversity appears in the approval of tastes and behaviors. Even so, as Lucius T. Outlaw enlightens, in *On Race and Philosophy* (1996) the human biodiversity, as races and ethnicities are valuable differences. We carry on the parallel and apply it, following Braidotti and Haraway, to the whole humans-techs machinic systems. The more differences there are, the more valuable the system will be. If the genetic variability is a value, also the variability of the code should be a value. The value of difference is not a principle quantity. More does not mean better and more objects/friends do not mean a greater freedom of choice.

We note that in the analysis of networks (including social networks), the terminology is usually heavily militarized. However, if we return to 'material' in a more narrow sense it should be noted how computers themselves are constructed with semi-conductor minerals that are extracted from areas that are constantly in conflict over these minerals (e.g. Congo), for that very reason. Globalization of goods is mainly the globalization of exploitation. We should not look away from the fact that our cool and ergonomic tools are produced by masses of Asian workers (especially Chinese) who are forced to declare in their contracts that they will not commit suicide at the factories they work at. Thanks, guys! The global market digests all differences. In the meanwhile, when we are purchasing the latest technological nonsense, we can perhaps gloat over how some skimpy tree was planted to offset emissions of C02. Green capitalism, however, remains as mad as any productivist ideology. No one is pure, and we are all involved.

However, despite being immersed in this technological world, we should try to take a distance from it and de-solidarize from ourselves, in order to write some kind of ethnography of social media. This should not focus on how they work (there are enough how-to's and manuals on that already), but about the reasons why we are in this situation and how we can influence it by injecting diversity, chaos and germs of autonomy. We are compromised and involved, but this does not mean we have to accept everything uncritically. If we start from the collective findings, we can derive individual conclusions, in a process of estrangement that proceeds from the inside out (rather than from the unfamiliar to the familiar as happens in classical ethnographic observations). We are the savages and we need a decidedly subjective look. We do not need the supposed objectivity of an outside observer.

Fortunately, the myth of scientific objectivity survives only in the inferior and vulgate. It has been more than a century since the hard sciences have taken the path of relativism and it now has become time that the 'human sciences' should follow them in this. We need radical relativism in order to observe our habits and behavior from the outside and to understand what we are doing. We have to make concrete our actions and we have to be able to communicate them effectively in a public space; a space that must be preserved, renegotiated and built relentlessly. In order to stop officiating at the rite of mass of domination technologies, we need to build new and conscious social rituals.

This is the whole problem then: the foundation of power and its transformation into domination. How do you create a device capable of not succumbing to the power of the sacred? There is a reversal of the sacred: the profane, the iconoclastic moment of carnival. Once you have built your little Olympus, you must renew it by following the correct rhythm. The autopoiesis processes we foster are the embodiment of this sense of continuous renewal.

Do you have any ideas? We have a few, so let us know!
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September, 2013

Per una corretta autopoiesi (For a proper autopoiesis)

INTRODUCTION

Google is the best known and most intensively used search engine of the Internet, so much so that it has, over the past few years, managed to become the principal access point to the Web. Surfers world-wide have become completely accustomed to its sober and reassuring interface, and to the unobtrusive yet ubiquitous advertisements adorning its margins. Its users have massively taken to its convenient ancillary services, and its use has become habitual to the point of an automatism: «if you don't know, Google it!». People will also 'Google' instead of checking the post-it they put on the fridge, looking into their diary, searching the yellow pages or consulting the Encyclopedia Britannica, now gathering dust on the shelves in the company of other hard-wired reference books that have become just too awkward to handle.

Google has managed to exploit this craving for simplicity to the tilt. It aspires to be the perfect and ultimate search engine that is able to understand precisely the query of its users and give them what they require in a fraction of a second. Its elementary interface, which can be directly personalized and yet remain immediately recognizable in its minimalist style, has become the daily escape route out of the claustrophobia of electronic screens for a truly phenomenal – and still increasing – number of users. It is a whiff of fresh air, a privileged window that is wide open, giving instant access to the fascinating world of the Net at large. See how many people have taken Google as their personal homepage! How many people think Google and Internet are the very same thing! And yet, beneath such simplicity and user-friendliness hides a colossus, an unbelievably complex and intrusive system out to achieve total control on the management of information and knowledge of the 'Mare Nostrum' the Web has become. Google is offering scores of free services to satisfy (almost) any desire regarding research and communication: email, chat, newsgroups, a file indexation system for your computer, image banks and archiving facilities for pictures, videos, books, maps, social networking and many other things. Why? Who is benefiting? Writing a critique of Google through the lens of its history, and deconstructing the mathematical objects that make it up, presents the opportunity to lay bare a specific strategy of cultural domination. This inquiry provides a more encompassing approach, in order to shed light on the backstage of a large number of applications we have become accustomed to in our everyday use.

This book starts with a brief history of search engines, reviewing the more crucial moments in the ascent of Google. Having survived almost unscathed the collapse of the 'new economy' bubble, Google has managed to establish solid linkages with a number of big multinational players in the IT industry. Its unremitting expansion in all sectors of digital communication has advanced a particularly distinguishable style that has set the trend across the entire cultural universe of the Web.

'Don't Be Evil' is the motto of Google's two founders, Sergey Brin and Larry Page. The two Stanford alumni have, thanks to an arcane management of their own public image, managed to create the notion of a 'benign giant', eager to archive our 'search intentions' in his humongous data banks. The digital alter ego of millions of users appears to be in safe hands at the Mountain View, California central data hub, better known as 'the Googleplex'. It is there – and in many other data retention centers that have mushroomed all over the planet – that nothing less than the war for total domination of the Web is being waged. First step is a cheerful embrace of 'abundance capitalism'. Biopolitical control stricto sensu is the name of the game here: working conditions are much better than merely comfortable, the atmosphere is chummy, and bonuses are raining down on the employees, who, happy and thankful, love to be exploited and become the best supporters of the company, and proud to be part of its conquering and 'be good' image.

The methods and objectives of Google have a positive outcome for all; the firm's philosophy, based on certified academic excellence, and the commitment to innovation and scientific research is rolled out in ten clear-cut 'truths' on Google's site.[2] These 'Ten Commandments' constitute a Gospel of sorts for the Digital Era, while the 'Google-thought' is propagated by pure and unassuming 'evangelists', all eminent personalities of the world of information and communication technology. Google's last but not least weapon is its adoption of the collaborative development methods that are the hallmark of the Open Source movement. Here, products are based on Free and Open Source Software (F/OSS), which is not protected by copyright or patents. In doing so, Google reduces the development and improvement costs of its own services, while at the same time obtaining the support of techies, hackers and various kind of other amateurs, and manages to profile itself as champion of free knowledge dissemination, since using its search engine appears to offer a way to access the Web that is both free and meritorious.

However, Brin's and Page's dream of 'The Whole Internet into Google', a dream pursued even inside reputed universities is a demagogic concept in the end, an idea that serves to abide by a near-positivist cult of scientific objectivity: as if in the chaos that is the Web, only a superior technology could vouch for the transparency of search procedures and accuracy of the results – and all this for the best of democracy!

Google's auto-proclamation of itself as a 'democratic' instrument is grounded on the allegedly 'democratic' character of the Web itself. Its indexation algorithm PageRank[TM] is constantly copying digital data in its data-centers, assigning them a value based on the links that are associated with each web-page. In fact, Google interprets a link from page A to page B as a vote in favor of the latter by the former. But it does not stop at counting the number of votes cast or links established by a page, it also weights that page in. If a page is deemed 'important', its votes will count for more and will thus 'add value' to the pages it links to. PageRank[TM] assigns a higher value to important and high-quality sites by using criteria and filters whose nature is not in the public domain, and which are used every time a Google search is launched. Google's 'democracy' hence shapes the

2. See, http://www.google.com/about/company/philosophy/.

web in accordance with the number and weight of the votes received by each web-page: it is a democracy filtered by technology.

There are a number of secrets hovering around the Colossus of Mountain View, but a fair number of them, as we shall see later, are fake. The mythical aura surrounding Google's technology is for a large part due to a lack of basic information, and of elementary bits of practice that could enable people to engage the technological revolution in cultural terms. To take just one example, the baffling speed at which search results are produced is merely the outcome of a drastic preselection process whose criteria are anything but transparent. Otherwise, how could millions of users browse ever so many millions of pages within Google's databases, all at once and all the time, if there were not some opportune filters in place to limit the scope of the search, for instance to limit it (mostly) to the data couched in the user's own tongue? And if there exist filters which enable a better navigation language-wise, why would one not assume that there exists many others, whose aim is to orient the searchers in specific directions? Google's miracle is in fact grounded in a closed source technology, in copyrighted trade secrets, and in non-disclosure agreements regarding scientific research discoveries. Search with Google is neither democratic nor transparent as often proclaimed, for the simple reason that it cannot be, both for technical and for economic reasons.

Google's white space where one types the key-words pertaining to one's search is a narrow entrance, an opaque filter controlling and directing the access to information. By virtue of being an informational mediator, a simple search engine reinvents itself as an instrument for the management of knowledge. This enables it to exert a stupendous amount of power, as it attributes itself near-absolute authority in a closed world. Google's cultural model is therefore one of technocratic domination.

Ippolita's aim with the present volume is to underscore the problem of digital literacy and critical orientation of the larger public on the issue of knowledge management at large. There is a social urgency in achieving this. Internet offers users extraordinary opportunities for self-education, in a way that even exceeds university schooling, especially in such domains as communication and information technology engineering. As Ippolita has shown in previous works, the Free Software movement is the most outstanding example of the necessity of continuous self-schooling and of an autonomous management of digital data.

But there is another side to this coin, a double negative: on one side, the constant debasement of the humanities as a model of education, despite the fact that there are many domains on the web devoted to them, and on the other, the considerable and augmenting cognitive palsy of the average user. Lost in the manifoldness of the data that are available on the Web, we tend to go for the most visible points of reference – Google being merely the most blatant manifestation of this phenomenon – without too much questions asked about what processes are running in the background; we part with our own private data with gay abandon, enraptured as we are by the myriad of decidedly efficient and useful services, which, as still appears to be the rule on the Net, are free to boot.

Ippolita insists on pointing out the lack of scientific popularization of the technological phenomena that have completely overtaken our society. Specialized technological manuals can be obtained aplenty, sociologists wax eloquent about the 'network society', politicians start imagining an 'open society', where the networks would form the substratum of global democracy.

But how many dedicated surfers know exactly what an algorithm is? Very few for sure. And most of them will put their trust in the returns provided by PageRank[TM] – an algorithm – that orders in a split second their search results and in doing so directs their experience of the Web. What is needed is the courage to prioritize scientific popularization without enclosing oneself in the academic ivory tower. It is absolutely necessary to be able to speak about macro-economics without being an economist, about info-mediation without being a certified specialist in communication studies, about self-education without being a pedagogue, about autonomous management of digital tools without being an elected politician. It is also absolutely necessary to open up the debate about fundamental concepts such as 'algorithms', 'sensible data', 'privacy', 'scientific truth', 'communication networks', all of which are discussed far too little by any sort of 'authority', 'regulators' or certification bodies', which cannot vouch for anything in the end.

The habit to delegate our work to machines unfortunately engenders a generalized lack of interest for the major changes our technological environment is undergoing all the time. These then take place in silence, or are covered-up in a media-induced fog, without their true nature ever being assimilated by the public at large.

The most common attitude encountered amongst those who are faced with the continuous and unfathomable 'miracles of modern technology' waver between wonder and frustration. And even mystical adoration sometimes kicks in, as if the digital realm was gilding the world with an esoteric aura, only to be unraveled by a handful of enlightened minds. Yet at the same time, the inability to celebrate in a meaningful way the cult of these new advances makes for deep frustration. As a research group the Ippolita collective was born precisely out of the conviction that change, and the interfacing of various competences and languages might be able to transform what is commonly called the digital revolution into something that enables one to understand our current epoch with its anomalies, as well as shedding some possible light on our future. Scientific research, humanistic tradition, political engagements and feminist methods are – among many others – the languages we intend to use in these voyages of exploration.

Ippolita's activities show that 'to put "it" into the commons' is just not good enough, that the level of thinking about information technology is still limited and the tool box of most users is far too rudimentary. It is therefore necessary to adopt an attitude that is both curious and critical, and to develop competences at the individual level, so as to understand how to have fruitful interaction with the digital world, and to develop tools that are appropriate to the objects themselves. Our hope is to multiply the spaces, and places and opportunities to be autonomous without succumbing, either to a facile enthusiasm or to a control-induced paranoia. *Just for fun* is our motto! The practice of collaboration is not a panacea that will automagically transform every technological novelty into a shared good; collaboration is also not in itself able to thwart technocratic domination in the

name of a greater electronic democracy. This is one of the main results of compulsive contribution need, the 2.0 Participation Myth: participation is Good by Nature, the more we are, the better it is, and Democracy is an *automatic result of online mass collaboration*. Digital activisms could be framed as interesting corollaries of the online mass participation myth, and Social Networks Fueled Revolutions are part of the same tale.

Going for this represents a superstitious vision of progress, which rides roughshod over individual choices. The synergy between networked subjects, in realms that are perpetually mutating, is not the simple sum of all concerned parties; it requires vision, passion, truthfulness, creativity and an ongoing renegotiation of the tools, of the methods, and of the objects and objectives involved.

CHAPTER 1. THE HISTORY OF SEARCH (ENGINES)

1.1 On Searches and Engines

Search engines today come up as websites enabling one to identify and retrieve information. The mistaken idea that the Web and the Internet are one and the same thing is an error harbored by the majority of users, because the web represents for them the simplest, easiest and most immediate access to the Internet. But the Net is in reality far more complex, heterogeneous, and diverse than the Web: it includes chat functions, newsgroups, e-mail, social networking and all other possible features individuals wish 'to put online', no matter in which format this information takes shape.

To put it differently, the Net is not a static but a dynamic whole; resources and their mutual interconnections are changing constantly, in a kind of birth transformation and death cycle. The physical connectivity vectors to these resources are also undergoing constant change. Once upon a time there was the modem connected by coper phone wires, and today we live in a world of broadband and optic fiber. And the individuals who shape the Net by projecting their digital alter ego unto it are also perpetually mutating, at least as long as they stay physically alive. Hence, the Net is not the Web; it is a co-evolutionary dynamic built up of the complex interaction between various types of machines: mechanical machines (personal computers, 'pipes', servers, modems aka 'hardware'), biological machines (human individuals aka 'wetware', and signifying machines (shared resources aka 'software').

As we shift through the dark mass of information that is the Net, we need to realize something fundamental, yet uncanny at the same time: the history of search engines is much older than the history of the Web.

The Web as we know it is the brainchild of Tim Berners-Lee, Robert Cailliau, and other European and US scientists. They created the first 'browser' between 1989 and 1991 at the CERN Laboratory in Geneva, together with the 'HTTP' protocol (Hyper Text Transfer Protocol), and the 'HTML' language (HyperText Mark-up Language) for writing and visualizing hyper-textual documents, that is documents including 'links' (internal to the document itself, or external, linking to other, separate documents). This new technology represented a marked advance within the Internet, itself a merger between various US academic and military projects.

As the web was still being incubated amongst a number of laboratories and universities across the world, search engines had already been in existence for many years as indexation and retrieval services to the information available on the Internet.

Obviously, the first search engines could not be looked into on the not yet existing Web: they were rough and straightforward programs one had to configure and install on one's own computer. These instruments performed the indexation of resources by way of protocols such as 'FTP' File Transfer Protocol for file-sharing, and 'Gopher' (an early rival of the emergent 'HTTP'), and other systems which have gone out of use today.

1994 saw the 'Webcrawler' come into operation as a search engine solely devised for the Web. It was an experimental product developed at the University of Washington. The innovations this search engine was bringing along were truly extraordinary. Besides functioning as a website and making it possible to do 'full text' searches, it also included a tool, the 'spider' that catalogued web pages automatically. 'Spider' is a software fulfilling two functions: it memorizes the information on the web pages it encounters as it navigates through the Web, and it make these accessible to the users of the search engine. As unbelievably innovative as it was in its time, Webcrawler was only able to return simple lists of web addresses as a search result together with the mere headline title of the web pages it listed.

In the last months of the year 1994, a new search engine, Lycos, came up. That was able to index 90% of the pages that were then extant on the World Wide Web (ca. 10 million in all) in a very short time. Lycos' principal innovation was to do without 'full text' systems, and analyze only the first 20 lines of the pages it indexed. It allowed Lycos to give as a search result a short synopsis of these pages, abstracted from these first 20 lines.

It was with Excite, launched in December 1995, that for the first time search results gave a ranking to web pages in accordance with their importance. Introducing an evaluation system that assigned 'weight' to a web page constituted a first, rudimentary, step towards a thematic catalogue: it would at last put an end to interminable lists of disorderly search results. It made a kind of 'initial checking' of a 'directory' of websites, comparable to a classic library system, with an indexation according to subject, language, etc. – but then for web resources.

Apart from that, Excite entered history for another reason: it was the first search engine equipped with tools that were explicitly geared towards commercial activity. After having acquired Webcrawler, Excite offered its users personalization facilities and free mailboxes, becoming one of the Web's most popular portals in less than two years (1997). Yet, Excite dropped its original business model not long after that, and chose to utilize search technologies of other firms, Google being the foremost among them today.[3]

This bird's eye view of Google's precursors would not be complete without mentioning what by 1997 had become the best and most popular search engine of all: AltaVista. AltaVista ('the view

3. Excite was not the first to include in its own search results those of other search engines. By the end of 1995, MetaCrawler had begun to include on its own websites the services of all the existing meta search engines. Today there are many meta search engines that perform cross-searches on a vast variety of databases.

from above') was based on the findings of DEC (Digital Equipment Corporation), from Palo Alto, California, a research group which in 1995 had succeeded to stock all the words in a random Internet HTML page, in a way precise enough to make possible a very refined search. DEC had granted AltaVista the further development of the first database that could be directly looked up from the World Wide Web. AltaVista's in-house genius was Louis Monier. Louis Monier clustered rows of computers together, made use of the latest hardware, and worked with the best technologists on the market, to transform his baby into the most common and best loved search engine of its days. AltaVista was also the Net's first multi-lingual search engine, and the first with a technology able to include texts in Chinese, Japanese, and Korean in its searches. It also introduced the 'Babel Fish' automatic translation system, which is still in use today.

By the time of its collapse in 1997, AltaVista served 25 million queries a day and received sponsor funding to the tune of 50 million US dollars a year, providing the search facility to the users of Yahoo!'s portal.

1.2 The Birth of Google: Once Upon a Time There Was a Garage, Then Came the University

The name Google stems from 'googol', a mathematical term to describe a 1 followed by 100 noughts. According to the legend, this was the number of web pages Larry Page and Sergey Brin dreamed of indexing with their new search engine.

Both met in 1995 at Stanford, when Larry Page, then aged 24 and graduated from the University of Michigan, came to Stanford to enroll for a doctorate in computer sciences. Sergey Brin was one of the students assigned to guide newcomers around the campus. Stanford was (and is) renowned as the place to develop highly innovative technological projects. This Californian university is not only a household name for its cutting edge research laboratories, it also enjoys near-organic links with companies in the information technology (IT) sector, and with keen-eyed venture capitalists ready to sink consequent amounts of cash in the most promising university research. Brin and Page turned out to be both fascinated by the mind-boggling growth of the Web, and with the concomitant problems related to research and information management. They jointly went for the 'Backrub' project, which got its name from the 'back links' it was meant to detect and map on a given website. Backrub was re-named Google when it got its own web page in 1997.

The fundamental innovation Google introduced in the search process was to reverse the page indexation procedure: it did no longer show sites according to their degree of 'proximity' with regard to the query, but showed them in a 'correct' order, that is conforming to the users' expectations. The first link provided should then correspond to the 'exact' answer to the question asked, the following ones slowly receding from the core of the search question.[4] It is in this perspective that the famous

4. We consider such an approach not only politically deceiving and inherently authoritarian but utterly unrealistic as well. It implies the existence of an authority able to articulate and subsequently 'consistently, promptly and correctly' respond to our desires. On the contrary, it might be the case that there are more ways, all equally satisfactory, to respond to a specific need/desire (see Chapter 5).

'I'm Feeling Lucky' option came about. Clicking it opens the very first link in the Google results, and is profiled as the indisputably 'right' one.

The algorithm that calculates the importance of a web page, known as PageRank[TM] and allegedly 'invented' by Larry Page, is actually based on statistics from the beginning of the 19th century, and especially the mathematical works of Andrey Andreyevich Markov, who calculated the relative respective weight of nodes within a network (see Chapter 4).

In the beginning Google was only an academic project, where the weight evaluation system was mostly dependent upon the judgment of 'referees' operating within the format of 'peer review'. In theory the method presenting the best guarantees of objectivity is called the 'double blind' reading, as is habitually applied to articles before they are accepted for publication in a scientific review. A contribution is submitted to two readers who are reputed scholars in their field; they are not to know the identity of the article's author (so as not to influence their judgment). The second 'blind' moment is when the article is being reviewed for publication, and the reviewer is deemed not to know who the two referees have been.

To sum up, the more positively a scientific article has been received by fellow scientists (who are supposed to be of an independent mind), the more the article is deemed to be important and worth consideration. Page adopts this approach in his research domain, and applies the theory that states that the number of links to a web page is a way to evaluate the value of this page, and in a certain sense, its quality. We will later go into detail as to how this passage from 'quantity' of returned information correlates with the 'quality' of the results that are expected by the user (see Chapter 6).

But this criterion is not sufficient in itself to establish quality, since links are not equal and do not represent the same value; or to be more precise: the static value of a link needs to be correlated with the dynamic value of its trajectory, since the Web is an environment (mathematically speaking, a graph) where not all trajectories have the same value: there are varying 'trajectory values' depending on the 'weight' of the various nodes.

And actually, to pursue further the metaphor relating to the scientific or academic review process of scientific articles, not all reviews carry the same weight. A positive advice by reviewers less prestigious, or worse, by reviewers not very much liked within the scientific community, can be detrimental to the article being submitted as too many insufficiently authoritative reviews undermine the credibility of a publication. Hence, according to Page links from sites that are themselves extensively referred to, are more important than others which are weakly referenced themselves. In this way, a trajectory (i.e. a link) that originates from a very popular site carries much more weight than one coming from a relatively unknown page. This is how a link from page A to page B is interpreted in the way of a scientific referral whose weight is directly in proportion to the reputation of the reviewer furnishing that link (it should be noted, however, that Brin and Page explicitly talk in terms of 'vote' and 'democracy' in this regard). The authority of the 'reviewer' becomes the measure of a site's reputation.

Google's web pages evaluation is thus built on the basis of a 'public' referral system which is allegedly the equivalent of the way the 'scientific community'[5] is operating, only not limited to scientists but including all the surfers of the World Wide Web.

Today, the organizational workings of the 'scientific community' and the issue of data-referencing in general have become crucial problems: in a context of 'information overflow',[6] especially on the Web, it has become increasingly difficult to estimate not only the importance of information, but also its trustworthiness, the more so since the very principle of peer review as an impact factor has in the meanwhile been questioned by scientists themselves. Amongst the more interesting alternative options are networks of publications available under copyleft, and 'open access' projects, which also include research in the domain of the humanities. This was the background to the launch of Page's 'spider' web-exploring program in March 1996 in order to test the page-ranking algorithm he had developed.

The spider-based search engine of the two talented Stanford students became an instant hit amongst their peers and more senior researchers alike, gaining a wider and extraordinary popularity in the process. However, the bandwidth usage generated by the search engine quickly became a headache for Stanford's system administrators. Also, owners of indexed sites had some qualms about the intellectual property rights pertaining to their content. Besides that they were not too pleased by the fact that Google's ranking system rode roughshod over more established evaluation systems – such as prizes and honorary mentions in favor of the number and quality of links (i.e. popularity): Google considers only the relational economy of sites expressed in terms of links, and nothing else. 'Spider' couldn't care less about the content of a page, so to speak.

Hence, the value of a search result must be based on the weight of the links between two pages, and not on some arbitrary classification enforced by the terms of the search. This breakthrough

5. The system of scientific publishing was born in 1665 when Philosophical Transactions of the Royal Society of London was first published. The first scientific journal, founded by Henry Oldenburg of the Royal Society of London, was a sort of public registrar of intellectual property, a patent office for scientific ideas, so to speak. The journal sought to introduce clarity and transparency in the evaluation of scientific discoveries by appointing a group of peers had to recognize their 'intellectual nobility'. This recognition in turn sanctioned the notion of intellectual property. The differential value thus assigned to scientific publications further established a hierarchy of excellence among 'peers'. Moreover, since scientific discoveries required publicity to be appreciated, publication guidelines became extremely important, and publications became the only means for scientists to gain visibility, fame and prestige.
6. The concept of information deluge ('déluge informationnel') has been developed primarily by Pierre Lévy, inspired by Roy Ascott's notion of 'second deluge', as part of a philosophical framework whereby the movement towards 'virtualization' acquires a central role, see: Pierre Lévy, Becoming Virtual: Reality in the Digital Age. New York: Plenum Trade, 1998 (the original French Sur les chemins du virtuel can be found here: http://hypermedia.univ-paris8.fr/pierre/virtuel/virt0.htm). On his part, Manuel Castells has been writing on 'informationalism' and 'information economy'. A large part of the economic analyses of the information deluge, especially in France, UK and United States, have a Marxist approach based on a debatable interpretation of the web's 'collective intelligence' phenomenon as a hypostasis of the Marxist notion of General Intellect; see for example: Wark McKenzie, A Hacker Manifesto, Cambridge: Harvard University Press, 2004.

turned out to be the key to Google's subsequent success in the years to come: search results would in the future no longer be fixed once and for all, but would vary dynamically in accordance with the page's position within the Web as a whole.

1.3 Google.com or How Ads (Discreetly) Entered the Pages

Page and Brin went on developing and testing Google for eighteen months, making use of free tools provided by the Free and Open Source Software (F/OSS) community, and of the GNU/Linux operating system. This enabled them to build up a system that is both modular and scalable to an extremely large extent, which can be augmented and tweaked even while being fully in use. This modular structure constitutes today the basis of Google's data center, the 'Googleplex', and makes possible the maintenance, upgrade, changes and addition of features and software, without the need to ever interrupt the service. By the middle of 1998, Google attended to something like 10,000 queries a day, and the in-house array of servers Page and Brin had piled up in their rented room was on the verge of collapse. Finding funds vastly in excess to what usually is allocated to academic research therefore became a matter of some urgency.

The story has it that Google's exit from the university is due to a chance encounter with Andy Bechtolsheim, one of the founders of Sun Microsystems and a talented old hand in the realm of IT. He became Google's maiden investor to the tune of 100,000 US dollars.

The birth of Google as a commercial enterprise went together with its first hires, needed for further development and maintenance of the data center. Among them was Greg Silverstein, now the CTO. Right from the beginning, Google's data center took the shape of a starkly redundant system, where data is copied and stored in several places, so as to minimize any risk of data loss. Its most important feature is the possibility to add or remove modules at any given time so as to boost the efficiency of the system.

Another major trump card, as befit university hackers, was Brin's and Page's habit to recycle and tweak second hand hardware and make extensive use of F/OSS. Their limited financial resources enabled them to evolve what would become the core of their business model: nimble modularity at all levels. The modularity of Google's ecosystem means that it can scale up and down according to need and availability. No need to reprogram the system when new resources, whether hard-, wet- or software, is added: the highly dynamic structure integrates the new modules, even if they are stands-alone.

Google formally opened its offices on September 7, 1998 in Menlo Park, California. As the story goes, Larry Brin opened the doors with a remote, since the offices were located in a garage a friend of theirs had sublet to the firm. A Spartan office-annex-garage then, but one featuring some not to be spurned comfort components: a washing machine, a dryer, and a spa. Right from the start, Google's company philosophy is about making employees' life very cushy indeed. By January 1999, Google left the Stanford Campus for good:

'The Google research project has now become Google Inc. Our aim is to give to the world searches of a far higher quality than what exist today, and going for a private company appears to be the best avenue to achieve this ambition. We have started to hire people and to configure more servers in order to make our system scalable (we are ordering servers 21 pieces at a time!). We have also started to launch our spider more frequently, and our results are now not only as fast, they have also a much better actualization rate. We employ the most talented people, and through them we obtain the latest and most performing Web technologies.'

Brin and Page then go on for a few more lines to talk about the ten best reasons to come work for Google, quoting tech features, stock options, free drinks and snacks, and the satisfaction coming from millions of people who are 'going to use and enjoy your software'.

The years 1998 and 1999 would see all search engines and other popular sites world-wide in the grip of the 'portal syndrome', a narrow obsession with developing sites that would attract and retain visitors on the site by providing ever more services, ads, and personalization gizmo's. Google contrariwise remained the only web instrument without ads and additional features. It was to remain a search engine pure and simple, but for that also the best, the fastest, and the one without commercial ties-up whatsoever.

But the firm could not survive purely on the money given by Bechtolsheim without generating any substantial profit, while at the same time pursuing its research on identifying and organizing information. Displaying a remarkable aptitude at talking the language of high finance, while constantly emphasizing their commitment to research, Brin and Page then managed to reach an agreement with California's two topmost venture capital firms, which astonishingly assented in co-financing together one and the same company. A totally unique occurrence, seeing two giant venture capital institutions agreeing to share risks and profits of a single business proposition. On June 7, 1999, Google was able to announce that Sequoia Capital and Kleiner Perkins Caufield Byers had granted it US$ 25 million in finance capital.

While one PhD thesis after the other saw the light at Google Inc., its two researchers-CEOs were looking for avenues to somehow commercialize the mass of indexed data. As a start they tried to sell their search service to portals by profiling themselves as OEM (Original Equipment Manufacturer), but this was not very successful. On the other hand, the business model that appeared to be more compatible to the new firm was one of direct advertisement, integrated within the search engine itself, and working by way of counting of the number of visitors who access the sites through commercial advertising links. This business model, called CPT, cost per thousand, has a structure that is as little intrusive as possible for the user. It is not based on flashy advertisement banners, but relies on discreet, yet very carefully selected links that appear above the search results. As these links are in a different font and color than the search results proper, they tend not to be perceived as too disturbing to the user's search activities.

1.4 Self-Service Ads, or Beyond the Dot Com Crash

A business model based on simple sponsored links appearing alongside search results does not make very much sense in terms of profit generation: at this stage, Google's long term commercial strategy was in need of a qualitative jump. So the presidents looked for commercially more promising solutions and came across Goto, a company founded by Bill Gross.

Goto's business model was based on mixing real search results with sponsored returns, and billing advertisers only if users actually clicked on their web-address, a format known in the trade as CPC, cost per click.

Compared to previous methods, this was particularly innovative. Sponsored links would only appear if they were functional to the user's actual search query, thus maximizing the likelihood of a transaction to take place in the form of a click-thru to the commercial site. Google tried to reach an agreement with Goto, but its CEO refused, which forced Google to seek an alternative, similar solution in-house. At that time, portals (like Excite, Lycos, AltaVista and Yahoo) were all using the CPM format, and CPC was something of a repressed wish. This shows that if you're not able to buy up a superior, mission-critical technology from someone else, you'll have to develop it yourself in an autonomous fashion.

March 2000 saw the implosion of the NASDAQ bubble, sinking all pipe dreams of the 'Dot Com' sphere. With them went also the CPM model,with its illusion of an unlimited cash flow thru its myriads of ad banners 'with millions of eyeballs' each. However, most of the time these banners were totally out of context on sites that had nothing to do with the advertiser's line of business. Google faced at that stage the dire need to look very closely at its cost and earning accounts, and to urgently find a way to make search technology acquire financial value.

The response came with AdWords, which saw the light in October 1999. AdWords functions as a sort of advertisement self-service, where commercial parties could choose the search keywords most likely to be associated with their own sites. AdWords was Google's solution to put Goto's 'keywords-based advertisement' into effect.

Google not only survived the Dot Com bust, it also was able, thanks to being a not – yet – publicly traded private company, to make good use of the opportunity to fish right and left for talent beached by all the other 'dot coms' gone belly up. By mid-2000, Google was answering 18 million queries a day and its document index contained 1 billion unique items. Six months later, queries had reached the 60 million mark.

1.5 Style, Form, and Services Overflow

In the beginning of 2000, most of Google's competitors had gone South, and the time was ripe for a new round of innovations, starting with proposing users a bevy of new services, which still continues. All services can be accessed from the Google homepage.

Every new service constitutes a piece of a complex, constantly re(de)fined mosaic, branching out to each and every domain of IT. At the end of 2006, Google offered 17 different types of searches in databanks of images, blogs, notes, books, maps, videos, financial services, etc. But it can also search and retrieve documents in a user's own computer. And there are many more services, present and to come. Two are specifically geared to application development and new projects under elaboration in Google's labs. There also six communication enabling services: Gmail, VoIP telephony, instant messaging, discussion groups, picture sharing, and translation services. Three services are for mobile devices. And finally, there is service suggesting software. And the number of services keeps adding up.

Even the most dull-witted user can easily grasp the reach and power of these instruments. By now, it is possible to type in a postal address or a phone number, and Google will instantly disclose all you need to know in order to contact a person or localize an object. One can also save one's search preferences, making the repeated use of the search engine a breathtakingly smooth experience. A typing error in the search query is promptly corrected by a highly advanced spell-checker, which is also able to 'learn' incrementally along the search process.

In 2001 Google launched 'Google Images', a dedicated search engine which in just a few weeks became the most sought after resource for DIY graphic production and has become one of the Web's biggest image banks. At the same time, Google also bought up Deja.com, and hence the Usenet archives, which constitute, with over 650 million posts on various newsgroups, a kind of 'historic memory' of the Internet in its pre-World Wide Web days, when such discussion groups were the life-blood of the Net. By April 2001, Usenet got re-christened 'Google-groups' with a new, pleasant interface making it easy to follow the more elaborate, edgy discussion threads.

From 2001 onwards new services followed each other in quick succession, or were upgraded without any apparent economic purpose or immediate financial return, as if Brin and Page were thrilled to show that a sheer inexhaustible data retention center could also bring about next to any technological feat one could dream about. The most illustrious instance of this is probably Google Earth, a behemoth repository mapping the Earth in detail, with some maps of the Moon, Mars and the Oceanic depths thrown in for good measure.

'Google News' saw the light in 2005, making Google's humongous databases available to journalistic work. Gmail started the same year, offering each user 1 gigabyte of personal storage. Beta-launched on invitation-only basis, it immediately created a network of personal linkages completely internal to Planet Google. Privacy naysayers were promptly silenced with the somewhat cranky argument that Gmail was 'an outstanding product', that 'its advantages far out-weight the doubts it may raise', and that 'it's bound to get ever better with time'. Any user of Gmail is however liable to be controlled by Google in its use of the service, since the enormous storage space made available is likely to incite the user to leave all mail messages on its servers. And since usage of the service was spreading by way of invites already registered users could freely extent in their circles, Google obtained crucial information on individual networks of friends and acquaintances. With other words, the archetype of an intrusive feature geared towards 'data-mining'.

Later came the 'Google Scholar' project, a universities-oriented search engine (2006), which enables to retrieve academic literature, but also articles submitted to reviews, working papers, M.A. and PhD theses, university publications, reprints, table of contents, bibliographies, reports, metrics, references and reviews published across all sectors of scientific/academic research.

Then there is Google Books, whose ambition is to make available online all books in digital format, by setting up agreements with libraries and even interested publishers world-wide, and scanning publications. Only the Google data center could make the dream of a global digital library a reality. But this dream is meeting fierce opposition from a large part of US publishers who are members of the AAP (American Association of Publishers). As hundreds of other little and big publishers worldwide, they fear a meltdown of their profits.

Yet, despite appearances this initiative of Google does not have the free circulation of knowledge as its aim. It is more about a shift in the monopoly to information, which in this scheme would be transferred from a handful of publishers to the one and only Google. Like in all dreams, there is a flaw: a solitary, private entity, named Google, is going to decide what constitutes the stock of collective information, by making it available through proprietary formats. The Open Content Alliance was started in direct reaction to this project, supported by the non-profit Internet Archive and by Yahoo! Its objective is to make as much material as possible totally accessible, through open formats.

Parallel to opening new services, Google showed a remarkable ability to milk the relational economy to the max, made possible by a keen utilization of the commercial data it indexes. AdSense, launched in 2004, offers site owners the possibility to host certain commercial links on their site, as suggested by Google on basis of the site's subject and particular keywords. Revenues accruing from such links are shared between Google and the owners of the participating sites. The innovation lies in monetizing the trust the site's users put in it. Google is now no longer on its own site only, but everywhere the Google 'window' is welcomed, and that unobtrusive little space promises to be always full of accurate and interesting data, such as befits Google, even if these data bits are now commercial suggestions. AdSense is thus factually the materialization of a 'Google network', a specific network meant to cross-link users data with their interrelationships for the benefit of advertisers. According to Google, AdSense is the network of 'sites and products partnering with Google to put targeted AdWords advertisements on a site or a product.' Obviously the AdSense system is also part and parcel of the 'Google Network'.[7]

And obviously, once you have put such a network in place, revenue must be extracted. We are still in 2005, and Google now experiments with a 'rerun' of the CPM model on the AdSense platform, following a 'site-by-site targeting' model. Advertisers will now again 'pay for eyeballs', but this time not according to the number of clicks on their banners but as a package deal sold through an auction process. Advertisers are able to choose in detail the profile of their prospective viewers:

7. This is the definition of Google Network according to Google https://support.google.com/adwords/answer/1721923?topic=82.

language, geographical area, issues of interest, etc. But moreover, such views will only happen within the 'Google network'. This appeals mostly to those who want to sell a brand rather than a product, i.e. those vendors favoring indirect marketing strategies. Here, 'brand awareness' is the name of the game, rather than selling specific products to keyword selected potential buyers, as is the case with the CPC advertising model.

This virtuous, or hellish, circle linking up the value management of its own immaterial products with the organization of the labor force and the frame-work of project development, is perfectly attuned to the modular building blocks system upon which the entrepreneurial philosophy of the firm Google is based. An endless growth is the precondition for the system not to flounder. The number of users searching with Google and hence trusting their data unto it must increase ceaselessly in order for the advertisers peddling their wares in the 'Google network' to keep growing alongside. There must be a continuous launch of new services, of new machines to keep track of it all, of new employees to maintain, improve, and invent them, of new users to make use of them, and of new advertisers to extract a profit from, and, and, and. Every new 'piece' of the system is being introduced as a new module, in an endless cycle: ever growing stockpiles of data, brains, users, and of their respective data, increasing quality of the handling of these data, in the dealing with employees, in the interaction with users and the management of their data archived in Google's data centers; always under the imperative of speed and further development, of course.

Brin and Page don't hide where their ambitions lie. 'Why would we let our employees start their own firms only to buy them up later on when we can pay them to stay with us, and do what they would have done in any case?' The 'Googleplex' – Google's operational Head Quarters in Mountain View, California – is a kind of university campus where people are pampered all the time. Employees are even given one paid day off a week to work on their own projects, which are then shown to the 'Google Duo', who offer both money and the support of the firm to the most promising talents, as a reward for their efforts.

1.6 Google, the Good Giant, goes IPO

'Don't be evil' or, do anything you want provided you're not naughty: thus is the motto of Google's 'capitalism with a human face'.[8] But already, quite a number of cracks are showing up in this 'being good' PR image: lawsuits galore, suggestions of fraud, sites being blacked-out, etc.

In 2002 Google had 1,000 employees on its payroll and owned more than 10,000 servers. Its service indexed over 4 billion documents and its net profits (somewhat reluctantly disclosed) amounted to close to 185 million US dollars. Given that size, investors started demanding more transparency, more control, and a more credible business profile. It's all right to have two brilliant – if eccentric – engineers at the helm, but please also hire a general manager with a proven business track record!

8. The philosophy of Google Inc.: http://investor.google.com/conduct.html.

After a few less than felicitous get-togethers and some intemperate public statements, the role of CEO of Google Inc. finally devolved to Eric Schmidt (who was already a top dog at Sun Microsystems and Novell). The two young prodigies kept taking pot shot decisions but this strategic managerial move soon proved to be a sound economic choice. Schmidt's arrival actually coincided with the first semester that the firm was in the black, demonstrating that it succeeded in making its products billable.

Page and Brin had postponed as long as they could the moment their company needed to go public, as they feared they would be forced to go on record regarding their business perspectives and profit expectations and that this would make their life less fun. It would also have made Google a much more open book, and give its competitors on the market sticks to beat it with.

But after the introduction of AdSense in 2004, and despite Page's pronouncements that 'Google is not your run of the mill company, and has no intention to become one', the colossus became to all intent and purposes precisely that: an all-American publicly traded company.

Just before the IPO, Yahoo! and other competitors lodged scores of complaints against Google, claiming copyrights and patents infringements with the aim to ruin the firm's reputation even before it had sold its first share.

Wall Street was then on the verge of lowering the initial floor price for the bid in view of the encountered difficulties, but Brin and Page managed to bury the biggest lawsuit, the one with Yahoo!, by paying Filo and Yang a compensation in Google shares and settling the differences regarding patents. Upon which the duo, against the stock exchange's best advice, proceeded with the IPO, in the midst of August, and with a 20$ reduction of the share price.

Yet within a day of trading, Google shares lifted from their 85$ launch price to 100 dollars, leveraging a cool 1,5 billion dollar paper profit in the process. One year later Google shares were quoted at 400 dollar, or a 300% increase in value. Google Inc. appeared to be surfing the wave in a marvelous world where nobody is bad, everybody wins, and evil simply does not occur. Granted, with such figures even a small downturn in share prices means millions of dollars going up in smoke, as happened in March 2006 when Google lost seven percentage points. Google is now a giant amongst the giants on the world's stock markets, and if it ever sneezes, many risk catching a cold with it.

1.7 Google Inc. or the Monopoly on Search

In October 2004, Brin and Page were flying their company jet when they learned that AOL (America On Line, the biggest US Internet access provider) had just closed a deal with Yahoo! to incorporate its search engine into their service. The youthful entrepreneurs immediately ordered a change of course, flew to London, and managed to prevail on AOL to shred the contract they just had signed and opt for a sweetheart deal with Google, to the tune of a cool 50 million US$. It's not exactly what you would call the gentle and open approach you'd expect from the 'good giant', but hey, business is business, even for the two nice guys research scientists from Mountain View!

In the meanwhile, Google's profits have grown by a multiplier of 4,000 in the course of a mere five years, making it the closest direct competitor to Microsoft and Yahoo!, and this not only in terms of stock market capitalization, but foremost in terms of popularity and hence of cultural domination of the consumer's mind. Millions of users are now using Google as their starting page when they go on the web. And they trust the results they get through the tools developed in Mountain View. Today Google's name is uttered in the same breath as the Web or even the Internet. The Californian search engine scores best when it comes to milk the relational network of its users and extract every cent possible out of millions small advertisers, so much so that for 2005, available data suggest an income in the range of 6 billion dollars on advertising products (whereas estimates for Yahoo!'s similar activities amount to 4,6 billion dollar).

The first swamp Google got bogged down in had to do with complaints that its searches were conflicting with the (US) legislation on trademarks. Symptomatic were the cases of Geico and American Blind & Wallpaper Factory versus Google. In both cases the complainants alleged that Google's AdWords service was illegally selling trademarked name-words. The tricky question was whether complainants could prevent Google from making their competitor's links appear when users would query on terms like 'geico', 'american blind', or 'american wallpaper'. Would a court follow that argument, then Google and its partners would face a severe drop in their revenues, since any owner of a trademark could deny its use by AdWords, and sue Google if it ever did. In France, luxury goods firm Louis Vuitton went to court on this and won. Google's answer is that if any tort occurs, it is the responsibility of announcers themselves and not of Google, since its role is merely that of a neutral carrier, and that besides, attempts to limit the sale of trademarked terms amount to a denial of the freedom of expression.

However, the giant of Mountain View itself falls foul on the freedom of expression issue with which it argued against the complaining firms, when it breaches the trust many users have given it in a matter that constitutes one of the most important sources of revenues. Google has always shielded itself behind the argument that the actualization process of its search algorithms and the objectivity of the workings of its machine were proof that query returns were beyond any kind of manipulation. But then, just before the American Blind case went to court, Google decided to withdraw a number of AdWords that had been purchased by Oceana.org, an activist group. Oceana's 'mistake' had been to publish an environmentally motivated critique of the operations of Royal Caribbean Cruise Lines, itself a major Google investor. This could be retrieved when searching for the 'AdWorded' terms 'cruise vacation' or 'cruise ship', keywords users would normally use to look for information about cruise holidays or associated activities. Google's official statement was that being a neutral medium, it could not condone any propaganda campaign deemed to be detrimental to the good name of other enterprises. Obviously, in such cases, freedom of expression is no longer a paramount concern.

To make things even weirder, on the very day the San Jose District Court was in session on the American Blind case, Google's search results in that very district were mysteriously at variance with results obtained in any other part of the world! For the first attested time, Google was caught manipulating search results with another aim than to return 'the best possible answer to a query'.

The fact that the court ruled in favor of Google in the Geico case (which was analogous to the American Blind one) does little to detract from this unsavory episode.

The most embarrassing and best-known case till now pertains to Google's entrance into the Chinese market. In order to penetrate this fast-growing, potentially immense market, Google for the first time publicly abided by a demand for censorship, making sites deemed illegal by Beijing authorities inaccessible to searches from within the Chinese territory. A Harvard study in 2002 had already shown that Google was blacking out 113 sites in its French and German language versions (Google.fr and Google.de). Google confirmed the facts, but argued that these pages had only be withdrawn on request of local government agencies and police authorities, and only after a careful analysis of their contents. Many sites were racism-oriented; others were informed by religious fanaticism. Someone then raked up a controversy, stating that Google's much vaunted transparency was crumbling and that users should be made aware of the existence of a 'hidden censorship'. Others countered that Google was not to blame, but rather the law system in particular jurisdictions where you could get sued merely for providing a link to an incriminated site on your page.[9] In such cases, it is natural that Google chooses to avoid legal consequences by withdrawing links after assessing the risks on individual basis.

It should be noted, while we are at it, that the issue of the 'right to link' is going to be a major bone of contention within the issue of digital liberties at large: Who decides what is legitimate censorship? An umpteenth 'Authority'? Or an international body? Or will it be 'might is right'? In a market economy, that amounts to the right of the party that pays the most, or carries most weight. Or will local, usually religious, fundamentalists have the last word, who black-mail with reprisals every time a 'subversive' site runs foul of their particular world-view? This problem is as far-reaching as the issue of freedom of expression itself, and obviously cannot be resolved in a courtroom. Emotions ran high in the Chinese case, because the censorship bid came from a government. Yet Brin and Page were too focused on the potential of a market representing a quarter of the world population to backtrack, despite this massive scale-up of the issue at stake.

For Google, the world will soon become a gigantic index in which a perfect correlation exists between digital resources and ambient reality. Each and every index will become computable by an algorithm and presented as a search result in the most convenient manner. And Google will be in pole position to be the instrument that shall maintain that index.

But, quite aside from the obvious observation that digital and real worlds do not necessarily coincide, even if they are very much intertwined, the perfect algorithm simply does not exist. It is simply not possible to retrieve all information that exists online. Also, nothing that is in the technological domain can be considered really neutral, especially not if it pertains to real-world data of online individuals.

9. The full version of the report by Jonathan Zittrain and Benjamin Edelman, can be found at: http://cyber.law.harvard.edu/filtering/google/.

Stemming from the partnerships that are likely to be entered upon, and of the technological convergence coming nearer every day, a new direction appears to emerge, and Google's 'vision' is forcing it upon us as the one and only access point and possible management and mediation of digital data. Google's dystopia as Big Brother wannabe becomes more precise, and is both dangerous and fascinating, as every historic power struggle: the Web is the new stage for a fierce competition to establish the new standard of communication. A standard that, paradoxically, is 'personalized', with offers and services that are geared towards the users' individual needs and tastes. For a few years now, the keyword has been 'mass personalization'. An oxymoron for sure, but one that comes loaded with the importance of the game, and which represents a paradigm shift, away from mass production consumerism towards a personalized one, sold to us as 'freedom of choice'. As for us, beyond rhetorical platitudes, we could find a response to this by simply making different choices: the question is not whether or not to use Google and its services, but to choose other ways to put our personal information on the Internet, and to learn how to link them up in a new fashion, making for more innovative and interesting trajectories for each one of us.

Since a number of years, Google has been learning to its own costs (and those of its users, of course) that innocence does not really belong to this world, and even less to the world of business, that total goodness amounts to stupidity in general, and more particularly so for a firm whose main goal is to make a profit, and that finally, neutrality is a very uphill road when war is raging between competing search engines. At this juncture it may be recalled that those nations that are traditionally neutral, like Switzerland, are also traditionally militarized to the core. And so we can see which kind of 'good' weapons Google has been using to achieve the status of a world-class phenomenon.

CHAPTER 2. BEGOOGLE!

2.1 Google's Brain Drain or the War for Control of the Web

'I'll *beep* this Google *beep* Eric Schmidt is a *beep* and I'll bury him alive, like I did with other *beeps* like him!'[10] Thus foulmouthed Microsoft's CEO Steve Ballmer when he learned in May 2005 that Google had just headhunted Kai-Fu Lee, a high-ranking employee of his, and key-man of 'Redmond' for China. Kai-Fu was the one who had developed MSN Search for the 100 million Chinese Microsoft users was boss of the MS research lab near Shanghai. Ballmer's expletives were of course targeted at his opposite number at Google, a former honcho of Sun Microsystems and Novell, firms that also Microsoft had battled with before, both on the market and in court.

Microsoft immediately started a court case against its former employee and Google specifically, accusing Kai-Fu Lee of violating extremely confidential contractual agreements existing between the Redmond and Mountain View rivals. Microsoft lawyers argued that Kai-Fu Lee, as executive director, had knowledge of MS industrial and trade secrets, and would not hesitate to put to use these technologies and the social network and economic know-how he had accrued at MS to bolster the profits of the competitor's firm. This contentious personage didn't come cheaply by the way. His entry 'salary' amounted to 2,5 million US$, with 20,000 Google shares as a side perk. Exorbitant figures which give some idea of the wager at stake – and we're not only talking about the Chinese market.

The lawsuit between the two giants was finally settled out of court in December 2005 – with just one month left before the case was to come up. The particulars of the deal are completely confidential. Maybe large amounts of money have changed hands, or maybe Microsoft managed to force Kai-Fu Lee to keep mum about anything he knew from his previous employment.

This story is merely one of the most emblematic illustrations of a trend that had become noticeable for a few years now: Kai-Fu Lee was actually the umpteenth senior employee that had switched to Google, 'the firm that looks more and more like Microsoft' as Bill Gates had loudly complained. Bill himself was left in a cleft shtick as he faced the nasty choice of either demonizing the two student prodigies –thereby reinforcing their image as his 'kind and generous' opponents in the world of IT – or to pretend that they did not really matter and were not worth very much attention as competitors.

10. Sworn statement by Marc Lucovsky, Microsoft employee delivered during the Macrosoft vs. Kai-Fu Li case; Lucovsky maintained that Microsoft was seeking revenge against Kai-Fu Li. See the article on the topics on CNET http://news.cnet.com/2100-1014_3-5846243.html.

The truth is that Bill Gates knew all too well how much a switch-over of managers means for a firm's core business, especially in the IT sector: often enough, Microsoft had made use of this same trick against its own competitors. The commercial tactic consisting in headhunting key personnel of rival firms in order to tap their industrial secrets and their production and resources management know-how has always been part and parcel of industrial competition. But in the era of the information economy, the practice has become markedly more prevalent, and more diffuse.

This management choice of Brin and Page clearly indicates what Google's ultimate aims are: to become the Web's most comprehensive and customizable platform, by adapting all its services to the singular needs of each of its users, together with maintaining an immense reservoir of information. To put it simply, Google is pushing full speed ahead to catalog every type of digital information, ranging from websites to discussion groups, picture galleries, emails, blogs, and whatever you can think of, without any limit in sight. This amounts to an open war with Microsoft, whose Internet 'Explorer' browser, MSN portal, and its Hotmail email service, makes it after all (and for the time being), Google's principal foe.

The overlap between the domains of interest of both firms is growing by the day: both aspire to be the one and only medium to access whichever digital activity. Microsoft has achieved predominance by imposing its Windows operating system, its Office software suite and its Explorer browser as the current computing standard both at work and at home. In its turn, Google has been profiling itself as the global number one mediator of web services, especially with regard to search, its core business, offered in all possible formats, but also with particular ancillary services such as email ('Gmail'). At the risk of simplification, one could say that Microsoft has been for years in a dominant position thanks to products that pertain to services, whereas Google is now seeking dominance through services running on products.

The outcome of this competition is dependent on users' choices and on the future standards Google wants to impose. Developing certain web programs intended to funnel requests for services only through the browser amounts to denying a market to those who have always invested heavily in products and in creating new operating software architecture. The same holds true for markets in the economy at large: there is a shift from a wholesaler/mass market approach (Microsoft), trying to sell licenses of one and the same product or service, to a completely customized one, where products can be downloaded from the web.

2.2 Long Tails on the Net. Google Versus Microsoft in the Economy of Search

Google's second line of argument is based on the key point John Battelle made in his numerous writings: the ascent of the 'economy of search'. In his essay 'The Second Search', Battelle, a journalist and counted amongst the founders of WIRED magazine, argues that the future of online commerce lies with personalized searches paid for by the users themselves.[11]

11. John Battelle, The Search: How Google and Its Rivals Rewrote the Rules of Business and Transformed Our Culture, Penguin Portfolio, 2005 http://books.google.it/books/about/The_Search.html?id=FR9PAAAAMAAJ&redir_esc=y.

Google, which is sitting on top of the largest databank of 'search intentions' by users, finds itself in the most advantageous position to realize this vision, thanks to its very finely ramified network, made up on one side by a famously efficient advertising platform (AdWords) and on the other by a bank of advertisers (AdSense) that is now good for several millions of websites. Google's wager is that it will be able to satisfy any wish the user may express through their search query, by providing new services geared towards 'consumerism at the individual level'. Each and every user/customer will hit exactly what she/he wants, the product that is precisely geared to her/his needs.

The best known of these 'mass personalized' online services is the one offered by Amazon.com, which is well on its way to make far more money out of selling books, cd's or any other item one at a time to individual customers than to pile up hundreds or even thousand of copies of a best seller item. The numerous customers buying not particularly well-selling books online constitute a myriad of 'events' infrequently occurring in themselves, and sometimes even only once. To be able to nevertheless satisfy such 'personalized searches' is the secret of Amazon's distribution power.

It would be impossible for a traditional book-seller, whose operational model is based on shops, stocks, and limited orders, to have the ease of delivery of million of titles at once like Amazon.com has: most of the traditional book-seller's revenues have to come from the latest publications and best-sellers. Selling one copy of a book to a single customer is not profitable for a traditional bookshop, but is is for Amazon.com, which capitalizes on the 'economy of search' of the 'online marketplace'.

This type of market is called 'long tail' in new economic parlance.[12] The theory of 'long tails' at least goes back to 'Pareto's principle', from the 19th century Italian sociologist and economist Vilfredo Pareto; saying that while a few events have a high occurrence, many have a low one. Statistically, such distribution is represented by a hyperbole graph of which the 'long tail' is made up of a myriad of events that are pretty much insignificant in themselves, but which taken together represent a considerable sum. Mathematically speaking, a 'long tail' distribution follows the pattern of what is called a 'power law', studied in particular by Albert-László Barabási and his colleagues.

Hence, the 'winning strategy' in a long tail market is not to lower prices on the most popular products, but to have a wider range of offerings. This makes it possible to sell 'searchlight products' a few items at a time, but from a very large range of different products. Commercially speaking, it turns out that the highest sales occur in the realm of small transactions. The majority of sales on

12. In the e-commerce context the notion of the Long Tail is widely used. Its relevance for marketing can be credited to Chris Anderson, Wired editor in chief who in October 2004 authored an article on the topic in this magazine. In 2005 Anderson published a book on the topic, The Long Tail (New York: Hyperion). Like Battelle, Anderson had a blog on the genesis of his book, www.thelongtail.com, and the term is now of common usage. The concept was not invented by Anderson; as any student who has taken an intro course in statistics knows, long tail is the portion of the distribution having a large number of occurrences far from the 'head' or central part of the distribution, in other words 'long tail' refers to the exceptional occurrence of a large number of events which deviate from the norm. Generally speaking improbable events may even be more numerous than probable ones.

the net follows a long tail phenomenon. Google creates turnover by selling cheap advertisements to millions of users with text ads, not by selling a lot of advertising space in one go to a few big firms for a hefty fee.

Battelle takes interest in the application of search on not yet explored markets. In the case of Google, the enormous amount of data that is needed in order to make search possible is also what has made the milking of the 'long tail' possible. In the domain of e-commerce, long tails have three consequences: first, thanks to the Internet, not-so-frequently asked products can collectively represent a larger market than the market of the small number of articles that do enjoy large sales; second, the Internet favors the proliferation of sellers – and of markets (as illustrated by the auction site eBay); and third, thanks to search the shift from traditional, mass market to one of niches becomes a realistic scenario.

This last tendency finds its origin in the spontaneous emergence of groups of like-minded people, something that now occurs on a large scale in networks. On the Internet, even the most important groups by number are not necessarily made up of homogeneous masses of individual people, but rather of colorful communities bonding together because of a shared passion, or a common interest or goal. Therefore the opposition between niche and mass is not very relevant for the identification of the segment of the market to aim at from a commercial point of view. This leads to the creation of e-commerce sites for products attractive only to a very specific type of potential customers, who would never have constituted a profitable market outside online distribution. Take for instance typically geeky T-shirts, or watches giving 'binary' time, flashy computer boxes or other must-have items targeted at the techie crowd. The amplitude of the supply makes up for the narrowness of the demand, which is spread over a very extensive range of highly personalized products.

An interesting article by Charles H. Ferguson for The Technology Review[13] points out that in such a scenario, it is most likely that Google and Microsoft will confront each other for real regarding the control of indexing, searching, and data-mining, and have this confrontation over the full spectrum of digital services and devices. Microsoft is now massively investing in web services: in November 2004 it launched a beta version of a search engine that would answer queries made in everyday language, and return answers that would be personalized according to the geographical location of the user; in February 2005, this MSN Search engine was improved further upon, and eventually became Bing. Microsoft has thus decided to develop its own web search system on PCs, without resorting to Google, despite the fact that the latter is #1 in the search business and has been for years (with Yahoo! as sole «serious» competitor).

Taken as a whole, it would appear that the markets that are linked to the economy of search are much larger than the existing markets for search services as such. Microsoft is undoubtedly lagging

13. Charles H. Ferguson, The Technology Review, 4 April 2005: Google and the Coming Search Wars, Revisited http://www.technologyreview.com/news/403933/google-and-the-coming-search-wars-revisited/.

behind in this area, but the firm from Redmond might well unleash its trademark savage strategies, which would be difficult for Google to counter. It could for instance take a loss on investments, integrate its search engine to its Explorer browser and offer the package for free, or start a price war on advertisements and so starve its competitor of liquidity. And in the meantime, the new Windows operating systems developed in Redmond are supposed to offer innovative search options. Moreover, Microsoft could carry on a number of joint ventures with others players, in the wake of the Microsoft-Nokia agreement in 2011, which leads to mobile devices manufactured by Nokia and equipped with Windows mobile OS. Also take note that Microsoft was lagging very much behind Netscape (the first web browser that was freely downloadable) in its time, and yet Explorer managed to replace and dispatch it – and not because it was so much better!

But if Microsoft indeed has a long market-experience and also has very deep pockets, Google does not have a bad hand either. It is the very incarnation of the young, emergent enterprise, it has built up a reputation as a firm that is committed to research and technical excellence, it preaches the gospel of speed with regard to users' search satisfaction and does so with nifty and sober interfaces. In one word it imposes itself by simply being technically the best search engine around. In this battle for control over the Web, Google appears to have a slight advantage. However, one should not forget that Microsoft's range of activity is without par since it covers not only the Web but the whole gamut of information technologies, from tools like the Windows operating system or the MS Office suite, to contents like Encarta, and high-end research platforms like dot.NET, etc. Given the wager at stake – basically the access to any kind of digital piece of information, and the profits deriving from it – peaceful cohabitation between the two giants seems unlikely. And new giant competitors have sprung up in the WWW Algocracy war: in addition to the aforementioned Amazon, there are Apple with its Store, and Facebook, among others.

For now, it is important to note that none of the players in this game is in a position of absolute dominance, something we can be thankful for. Imagine what the situation would be if a complete monopoly of search, by whatever private actor, existed by virtue of its factual imposition of one standard. Obviously, the first problem to arise would be the issue of privacy: who would down the indexed data on which searches would take place, reaping humongous profits in the process?

Moreover, since it is already possible to tap into quite an unbelievable amount of information just by typing the name of an individual in the Google search bar, and since in the near future the quality and quantity of such information not only will greatly increase, but even be further augmented by the possibility to cross-search among heterogeneous data, one can assume that the control exercised on individuals will become ever more suffocating and totalitarian: it will cross-aggregate confidential data with medical records, phone conversations, e-mails, pictures, videos, blogs and opinion pieces, instant messaging, social networking stuff and even DNA info. Google would then become the premier access point to the digital panopticon. So let's have a look at the weapons that are deployed in this very real war for the control of the networks.

2.3 Exhibit #1: The Googleplex, or Nimble Capitalism at Work

The customary panegyric of Google tells with glee the saga of the firm's impressive growth, which saw Brin and Page move from their dorm in Stanford to the Menlo Park garage sublet by a friend to the newly founded Google Inc., and then on to the offices on University Avenue, Palo Alto, to culminate in them taking possession of the Googleplex in Mountain View, California, where the firm is now headquartered. Between 1998 and 2000 the pair fleshed up their formula through a company philosophy based on innovation, creativity, and sacrifice. The sort of commitment you see in science, but then applied to commerce, is their key to success.

Right from its beginnings, the Googleplex attracted droves of eager collaborators: retrieving the typical environment of an American campus, where study, commitment, sports and games mesh into a whole. The idea behind this environment is that if a comfortable and relaxing environment stimulates the students' creativity, it obviously will also boost the productivity of workers. The spirit of fraternity and the academic elite mentality of working with total commitment for the very best results, both seem the bread and butter of stories about the Googleplex. Rumor has it that large swatches of the car parks are earmarked twice a week for roller-skates hockey and that masses of gadgets and gizmo's cramp the offices, with multicolored lava-lamps being favorite. A chummy easy-going atmosphere is the norm, with 'Larry and Sergey' chairing the weekly 'TGIF' (Thanks God It's Friday) meetings with dozens of employees assembling in an open space created by pushing the office furniture aside.

Right from the beginning, such an informal atmosphere was intended to build-up the community spirit and to encourage the sharing of ideas. Indeed, the Googleplex looks like a place to celebrate one's passion for research rather than an everyday workplace – which of course it is. But not an ordinary workplace, despite its by now gigantic dimensions. Granted, the 'campus style' organization of work had been widespread in the USA for the past thirty years at least: Microsoft and Apple, to take but two examples, have always worked that way. Silicon Valley's mythology is replete with stories illustrating the paramount role assigned to creativity, and stress the importance of collaboration between co-workers. No better boost to productivity than happy employees who are glad to work for a company whose objectives they hold equal to their own, as opposed to workers oppressed by a rigid hierarchy, enslaved by rules and inflexible schedules in a dreadful environment.

Perhaps the novelty of the Googleplex resides in having promoted, deliberately and right from the beginning, the idea of a 'different' 'new-fashioned', 'made for the best *brains*' place of work. You can't come into the Googleplex unless you know someone working there. And once in, photography is forbidden – in theory at least – as if to shield it from the mean world outside, full of finance sharks and other malevolent IT predators out to pry on the talents of the 'Googleboys'.

Everybody wants to work in the Googleplex. An unofficial survey of all the fantasies out there would for sure list: company work-out room, swimming pool, free food in the four staff restaurants (one of which vegetarian) free drinks and snacks everywhere (who needs vending machines? Google picks up the tab!), volleyball and basket ball fields and other outdoor sport facilities, buggies to dart

from one building to the next, and so on. But that's all nothing compared to the kiddies daycare, kindergarten, and primary school run by the company – free of costs of course, and don't forget the dental surgery, actually a mobile dental lab in a van, also completely free of costs. In a country like the US, where education and health care come with a huge price tag, and leave so many people out, these are truly unbelievable perks.

The workspaces also are spectacular; the dreams of an IT über-geek come true. Big LCD plasma monitors are standard all over the place. Life-size Star Wars figures, a riot of hi-tech gadgets, etc.: Toys and games galore. Fluor-colored lava lamps as the omnipresent *accessoires du jour*.

Googleplex is a dreamland, a green workspace, with flexible hours, and where everything seems possible. In one word, the Googleplex radiates the Google philosophy, and unfolds the Google lifestyle – of course there is a collection of all imaginable must-have enterprise gadgets, one can shop on a dedicated merchandising site. Most are, as befits gadgets, totally useless and/or superfluous, but all contribute to a sense of pride, boosting the feeling of being part of the firm. Gone are the dull sweaters and jackets with the firm's logo embossed: Googleplex's conditioning is much more nimble than that!

Google is , however, not the only firm taking that road, although it has gone the furthest along. Sure, Apple and Yahoo! have been providing a catalog of firm-related goodies, ranging from a complete line of attires to all kinds of hi-tech accessories, MP3 players and USB keys, all in the colors or with the logos and motto's of the firm. But Google's trade shop is much more versatile: from foibles for newborns to 'Google Mini' the system that enables you to index your data 'just like Google'. The Googleplex is abundance capitalism in the informational era made 'flesh': all the world's information made available to all, for free. The era of scarcity is over. The plenty and availability of goods (in this case, of information) is simply limitless. But let us not forget that, in the end, almost all of this plenty comes from advertising, itself mostly links based on text. All the remainder is free – as in free lunch.

2.4 Exhibit #2: perfecting the strategy of accumulation

The reason for the 'flight of brains' towards the Googleplex, as described in the beginning of this chapter, now becomes clearer. For an average employee in the IT industry, and even more for an 'independent' (read: precarious) IT worker, a job at Google is a dream come true. In this branch of industry, there are more and more exploited precarious workers. An exemplary illustration is that of the independent coder who works on personal 'projects', maybe by publishing them on sourceforge.net or slashdot.org, offering his competences on the market without any kind of status or union protection, nor any of the other guarantees that feel like prehistoric remnants in these times of total flexibility. But at the Googleplex not only he will get all of them, but he will be invited to do ever more his best and get to devote 20% of his time to personal projects while being paid for it.

To find life boring would be rather difficult amidst games of volley or basketball, dogs running around the company campus and its corridors, and casual meetings around a ping-pong table.

Since it is difficult to find new recruits that would be able to further improve the prevailing atmosphere, Google is now resorting to rather novel hiring techniques. The most curious probably being the riddle they splashed on gigantic white billboards along the highway and in a few mass transit stations in Cambridge, Massachusetts in July 2004:

{*First 10 digit prime in consecutive digits of e*}.*com*

The natural logarithm meant here is the number 7427466391. Going to the address http://www.7427466391.com one would find a Google IP address asking you to complete a sequence of numbers. After finding the number 5966290435 you had to follow instructions, using that number as password to enter into a section of www.linux.org (!) from where you were redirected again to Google's 'labjobs' site where you could upload your resume. If you'd managed to resolve all these riddles, chances were you'd make good Google material!

But Google does not only attract the best techies, hackers and assorted über-geeks. Quickly enough, the highest rewarded IT managers got wind of Google's career potential and vied with each other to enter into the company.

Google's brain accumulation equivalent follows closely its strategy of accumulating data to conduct searches and of networked computers to stock all the data and back-ups . Semantic machines, electronic machines, biologic machines: text, pictures, audio, video, computers, servers, humans, all are accumulated at the Googleplex, in order to nurture a life-style, or maybe even a kind of cult of excellence, incarnated in an 'evangelist'.

The person representing the company's style best, the one who is called Google's 'Chief Evangelist', is not one of the many youngsters around, but a true sea dog of the Web: Vinton G. Cerf, who together with Robert Kahn invented the TCP/IP protocol. The particulars of his arrival at Google are worth a little diversion: In February 2005 Google announced that ICANN, the supervisory body of Internet domain names and numbers, had given permission it to set shop in the domain registry trade. By next September, Google announced that Vinton Cerf had become 'senior vice-president and Internet Chief Evangelist for Google, with the mission to identify new technologies and strategic applications for the firm, on the Internet and on any other platforms'.[14] Till then, Vinton Cerf was, among many other occupations, ICANN's board senior adviser. However, unlike the hiring of CEO Eric Schmidt's and other top-level management staff being headhunted at Google's competitors, Vinton Cerf's hire looked more like a PR stunt. Amusing as it may sound, he is unlikely to be a regular at the Googleplex...

2.5 Exhibit #3: Reputation is all, but a little bit of 'philosophy' doesn't harm either

Google's public reputation cannot be reduced to its site and sleek interface, with the simplicity and speed that has earned the firm so much success. It can also not be reduced to the Googleplex,

14. Vinton Cerf at Google: 8 September 2005: http://googlepress.blogspot.it/2005/09/cerfs-up-at-google_08.html.

of which copies are mushrooming all over the world, like Valhallas of technology's über-gifted. And it's not just about 'Being Good', and yet making a lot of money, combining brazen commercial strategies with academic culture and F/OSS communities through its incentives and funding.

Where the image and reputation of Google also, and mostly, resides, is in its 'philosophy', which is expressed, in a clear and easy to understand language, as the 'Google thought'. The word 'philosophy', however, might be slightly misplaced, since this 'thought' is not really informed by the love of knowledge and transparency. But anyway, one can find the Ten Commandments that guide the actions of the 'Good Giant' Google online.[15] The first sentence of this gospel already sets the tune: 'Never settle for the best', as indeed, according to Larry Page, Google's ultimate goal is the 'perfect search engine', which understands exactly 'what you mean and gives back exactly what you want'. Thus Google does not strive to reach the greatest number of people possible, it wants to reach all people, satisfy everybody's desires; in short, it wants to bring happiness to Earth. In order to achieve this, it works relentlessly on research and innovation, as laid down in 'The ten things we know to be true'.

1. 'Focus on the user and all else will follow.' Google's growth was fueled by word of mouth, and attracted users who were enthusiastic about its performance. This is the exact opposite of aggressive advertisement campaigns. Ads should not jump on users, but instead present something useful.

2. 'It's best to do one thing really, really well.' 'We do search. With one of the world's largest research groups focused exclusively on solving search problems, we know what we do well, and how we could do it better. Through continued iteration on difficult problems, we've been able to solve complex issues and provide continuous improvements'.

3. 'Fast is better than slow.' 'We know your time is valuable, so when you're seeking an answer on the web you want it right away–and we aim to please. We may be the only people in the world who can say our goal is to have people leave our website as quickly as possible.' Two major intuitions, and realizations, have enabled Google to arrive at this 'speed': the development and constant amelioration of the PageRank[TM] algorithm, continuously indexing the networks, and the use of modular platforms that are interlinked and extremely flexible ('clusters'). Now speaking of speed as the Holy Grail, it might be a timely idea to think a little deeper. Sometimes, even in the realm of IT, slow maybe a virtue.
'Democracy on the web works.' 'Google search works because it relies on the millions of individuals posting websites to determine which other sites offer content of value.' We already know that Google uses PageRank[TM] to evaluate the sites linked to another web page and to assign them a value partially based on that of the sites to which they are linked. The representation of this electronic democracy is rather idyllic: Google's index results are allegedly a 'people-based ranking index' based on an algorithm doubling as electoral law. This would supposedly enable the users-citizens of the Net to express their confidence

15. See, http://www.google.com/about/company/philosophy/.

or cast their vote by providing links to other pages, with the respective position of favored websites as a result. Even without resorting to Tocqueville's philosophical observations on the *dictatorship of the majority* of, referring to the US, it seems clear that the equation 'link = vote' is rather simplistic and forced. Furthermore, filters by both personal and social profiling, and a number of 'refinements' are constantly being introduced to calculate rankings, by selectively tweaking the value of these votes/links. (One could speculate that a link provided by a porn site might weight less than one coming from an university. Which may lead to the question whether academic culture ranks higher in popularity than porn...) It is certain however, that with the continuous growth of the mass of information, this 'democracy' is bound to expand exponentially.

4. 'You don't need to be at your desk to need an answer'. The world is increasingly mobile and people are unwilling to be constrained to a fixed location. Whether it's through their smartphones, tablets or even their automobiles, people want information to come to them. Flexibility of time and space is an important objective. The convergence of electronic media (TV, radio, phone, Internet...) towards miniaturized mobile platforms is a previously unheard of boon for the world's largest supplier of search solutions. As with the 'war of standards', early penetration of future markets is 'strategically' vital, especially for Google, which produces search interfaces, but not the electronic hardware for this software (like Microsoft and Apple). Each new device out on the market is therefore a new territory to be conquered.

5. 'You can make money without doing evil.' 'Google is a business. The revenue we generate is derived from offering search technology to companies and from the sale of advertising displayed on our site and on other sites across the web.' The advertisements are text only, and hence not very intrusive. The proposed links are relevant to the search query (AdWords). And users can very easily become advertisers themselves: it's a DIY formula. If you maintain a website, you can even make money on the Google network through AdSense, by putting up ads that are relevant to the content of the site. 'Don't be evil' and 'Don't harm anyone' apparently also means 'Don't advertise those who don't advertise you', and of course the guarantee that PageRank[TM] is not for sale. The trust users put in the correctness of the search returns is Google's major asset and shall not be squandered for the sake of short-term benefits. Rather Google aims to generate indirect, 'second line' incomes, based on advertisements.

6. 'There's always more information out there.' 'Once we'd indexed more of the HTML pages on the Internet than any other search service, our engineers turned their attention to information that was not as readily accessible.' Google indeed accumulates a bevy of heterogeneous databases: images, newsgroups posts (Usenet), telephone numbers, postal addresses, financial information, etc. By managing such an incredible and increasing amount of data, Google has become one of the New Masters: Big Data Algocracy is their key-value. If your aim is to be the world's largest info-mediator, accumulation of data should know no limits!

7. ‘The need for information crosses all borders.’ ‘Our company was founded in California, but our mission is to facilitate access to information for the entire world, and in every language. To that end we have offices around the globe’. An Academic, American Culture for All. You need to have a grand vision of things: whatever happens, index more and more information, and make it accessible to everyone. ‘Localization’ is an essential part of Google’s universalism: speakers of be it Korean or hackers’ jargon, Hindi, Xhosa, Star Trek’s Klingon or even ‘Pig Latin’, Zulu, Esperanto, Muppet Show’s ‘Bork Bork Bork’ – all should have access to a dedicated Google search site. The interface languages run into 100+. Google is #1 search engine in over one hundred countries. A very impressive performance, but verging on a trickle towards the totalitarian… The whole operation hints at political correctness and appears respectful of minorities, but the reality is that we are dealing with a ‘super-layer’, the surface sheet of the one and only interface, which flattens and homogenizes differences, spreading the Mountain View style all over the planet.

8. ‘You can be serious without a suit.’ Google’s founders have often stated that the company is not serious about anything but search. They built a company around the idea that work should be challenging and that challenge should be fun. This aptly sums up the Googleplex, which is organized like a campus in order to maximize profitability. Hence we are told that ‘There is an emphasis on team achievements and pride in individual accomplishments that contribute to the company’s overall success’, and that ‘this highly communicative environment fosters a productivity and camaraderie fueled by the realization that millions of people rely on Google results. Give the proper tools to a group of people who like to make a difference, and they will’. Maybe this is the ultimate method to exploit ‘creatives’, transforming them into enthusiastic supporters of the ‘Google experience’ at the same time.

9. ‘Great just isn’t good enough.’ ‘We see being great at something as a starting point, not an endpoint. We set ourselves goals we know we can’t reach yet, because we know that by stretching to meet them we can get further than we expected. Through innovation and iteration, we aim to take things that work well and improve upon them in unexpected ways.’ Of course, in order to satisfy all the desires of all the world’s users, and that ever faster and ever better, one needs to perpetually push back the point where one’s desires are satisfied. One must desire to desire to be the best. Seen in this context, being second is worst than to not exist at all.

As far as we are concerned we’d rather go for the following motto: ‘Making money, within a firm devoted to excellence, is our moral obligation!’

2.6 Exhibit #4: Google and Open Source

Google’s most complex weapon probably is its strategy of co-operation-slash-exploitation of the world of F/OSS. The Google Code initiative (started March 2005) is a token of honor towards the F/OSS community: ‘we are friends of theirs’ say the Google’s founders, ‘because we owe them a lot’. Google Code supposedly is not about promoting the development of applications working on its own APIs (Application Programming Interfaces), since there is already a site devoted to them,

but to make F/OSS development tools that are of public interest and available to everybody. The first four projects on Google Code were actually programs created by Google's own engineers to optimize creation, optimization and debugging of code. The projects affiliated to Google code are distributed under a BSD 2.0 license (meaning the code may be used both on F/OSS and on proprietary applications). Moreover, Google has recently promised to make all kinds of software available to the F/OSS community, which are mostly the outcome of the famous 20% of time employees get to devote to personal projects.

So it's not a total coincidence that shortly after launching this initiative, Google embarked on a robust recruitment drive of F/OSS developers: the 'Summer of Code', a contest of talents with a 4,500 US dollar prize money to be won. Later came 'Google Earth', and finally, like every power that has achieved to create a distinct life-style of its own, Google materialized a long-cherished dream: www.google.com/moon. Yes, Google's on the Moon!

'To honor the first landing of Man on the Moon, on July 20, 1969, we have added a few NASA images to the Google Maps interface so that all can pay a visit to our celestial neighbor. Have a nice trip!'[16]

We will hear more and more about the techno-enthusiastic projects by Google. Like self-driving cars, and research on quantum computing reveal the affinities of Google with anarcho-capitalist dystopias: an automated New World of liberties guaranteed by machines ruled by algorithms. As Larry Page said at the Google I/O 2013 keynote: 'I think as technologists we should have some safe places where we can try out some new things and figure out […] What is the effect on society? What's the effect on people? Without having to deploy it into the normal world.'[17] Techno-faithfuls are surely waiting for the incarnation of the Google Being in some Google Islands, out of the regulators' control, where the Google dreams will become reality. Singers of the Google Way of Life are already out there, as evidenced by Steven Levy in his 2011 book, *In the Plex: How Google Thinks, Works, and Shapes Our Lives*.[18]

Google's moves, which are those of a typical 'quasi-monopolist' in both its methods and its aims, already have had a direct effect on its competitors. Today, Google is fast on its way to become a giant occupying all spaces of the market; its constant stream of new services choke smaller companies to death, as they are desperately battling to recruit engineers and developers, and live in the constant fear to see their products poached and duplicated.

The continuous launch of new services, coupled with the in-house funding of potential spin-offs by its own work-force, make that Google today factually has closed the market in terms of

16. See, http://www.google.com/moon/about.html.
17. Larry Page at Google I/O Keynote 2013, full speech: http://www.youtube.com/watch?v=Zf2Ct8-nd9; a resume can be found here: http://www.businessinsider.com/google-ceo-larry-page-wants-a-place-for-experiments-2013-5.
18. Steven Levy, In The Plex. How Google Thinks, Works, and Shapes Our Lives. New York : Simon & Schuster, 2011, http://books.simonandschuster.com/In-The-Plex/Steven-Levy/9781416596585.

technological innovation. Indeed, who would risk financing a Web-based project today, knowing full well the risk that in a matter of days, it could be Google that launches it?

Google has managed to represent itself, both to observers and to the average users, as a stalwart of progress. Starting with its search engine, designed in a way to be rapidly and easily understood by its users, it has multiplied ideas and proposals for new services.

With its choice for F/OSS, the relational economy that Google engineered has become a 'world view' that can immediately be adopted as a desirable evolution towards a 'benign capitalism' as a dispenser of abundance, the kind of 'ethical' economic dispensation that individuals are looking for.

CHAPTER 3. GOOGLE OPEN SOURCE

3.1 Theory and Practice: 'Open' Is Not 'Free'

'Free Software' and 'Open Source' are terms, often used as synonyms, referring to code or portions of code. Though both terms often are used to describe the same objects, their perspective is radically different. This difference is a fundamental issue for Ippolita, whose first essay, published in 2005, was *Open Is Not Free. Digital Communities Between Hacker Ethics and Global Market*. Free is a matter of freedom, and freedom is not for free: at least, it costs a lot of effort and desire. Open is a matter of openness, mainly to so-called «market laws».

'Free Software' is a term coined in the beginning of the eighties of the previous century by Richard Stallman, and is about the absolute freedom it allows the user to use, modify,and improve the software. This liberty has been precisely set out in the famous Four Fundamental Freedomsz (see fsf.org):

> The freedom to run the program, for any purpose (freedom 0).
> The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.
> The freedom to redistribute copies so you can help your neighbor (freedom 2).
> The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

The term Open Source, on the other hand, emerged at the end of the nineties, when Bruce Perens and Eric S. Raymond (who founded the Open Source Initiative (OSI), referring to the Open Source Definition that was derived from the Debian Free Software Guidelines) started an initiative of ten practical points defining which legal criteria must be met for a license to be considered 'free' or even better, 'Open Source'.

It is evident, therefore, that there is a difference between on the one hand, Free Software that emphasizes freedom as outlined in the definition 'Free Software is a matter of liberty, not price', and on the other hand, the Open Source that exclusively focuses on defining, for an entirely internal market logic what the best ways of promoting a product in an open manner are. Free Software has a meaning that goes well beyond the market (though not excluding it a priori), while Open Source exists, as specified by its promoters, to adapt to an existing model (the 'free' in the sense of 'free' in the market).

The interaction between 'free' methods of development and the net economy at large would lead, in the years following 2YK, to an explosion of the number of 'Open Source' products as well as to heated political debates around software patenting, digital property rights and generally about ethically and politically acceptable norms of 'intellectual property' management.

Google was very much involved in the rocky history of F/OSS, but only because it adopted, like many other dynamic and innovative firms, the F/OSS methods in order to pursue its 'mission'. The contiguity between F/OSS and Google is one of place and of time. A number of important free software projects saw their light at Stanford University in 1998, just as Brin and Page were putting the last hand on the first version of their search engine. Think for instance of SND and 'Protégé', which both would become extremely successful in their respective digital domains (audio and semantic web).

It is no surprise that Brin and Page, influenced by the Stanford hacker culture, were to have a preference for the GNU/Linux development platform. Even though there are significant differences between Free Software and Open Source, there are also many common elements and shared viewpoints. For the sake of clarity, we will use the term /'Open Source'/ 'F/OSS', for Free and/or Open Source Software to refer to the phenomenon of embracing Free Software, Open Source software and its manifestations as competitive element in the IT market.

The first characteristic of a F/OSS community consist of adopting working methods that are open to the collaboration of all comers, meaning that it will potentially accept spontaneous input and interaction from any party that is involved in the creation of digital artifacts, be it a coder, a programmer, or even an ordinary user. In the hacker jargon, this approach has been described as the 'bazaar' model and its widespread acceptance can be attributed to the way in which the Linux kernel was developed in the beginning of the nineties. This project, initiated by Linus Torvalds, forms the basis of all GNU/Linux distros (distributions: software suites, often a whole operating system).

The new co-operation techniques developed by the digital underground dispatched Brook's infamous law, which up to now had been the bane of IT projects' development teams. Following Brook's law, which predicates that the number of errors grows exponentially as complexity and lines of codes increase, it seems inevitable that a project in which thousands of developers participate must end up in a chaos of unstable code and innumerable bugs. However, contrary to what was to be expected, the publication of the source code, and the free circulation of documentation on the Internet, together with the co-operation and spontaneous feedback of an ever growing number of participants, have enabled F/OSS communities to demonstrate that it was possible to considerably improve the development of digital artifacts, both process– and results wise. Software developed this way is usually shipped under a General Public License ('GPL'), leading to 'viral' distribution of products under copyleft.

Despite the fact that the GPL license does not restrict commercial use, it has often been superseded by 'diluted' variants; similar to what happened with 'Free Software' when its emphasis on freedom

was perceived as too pronounced. This is the case for the BSD (Berkeley Software Distribution) license, which does not restrict closure of the codes, and hence impairs viral transmission, as the 'free' code could be augmented with 'non free' portions, resulting in an originally free creation becoming proprietary in the end. There are also other forms of 'free'licenses these days: MPL (Mozilla Public License) for instance. And there are many others that are custom-made for various new F/OSS products as they appear on the market.

This way, the market economy also hosts a sustainable development model, and the developers community is becoming the kernel of a truly 'Open Society', often thought as a chimerical Shangri-La. This imaginary position is not only determined by the moral allegiance inspired by the practice of collaborative development, but also, and actually foremost, by the fact that F/OSS applications are usually superior to proprietary ones, despite (or thanks to...) the fact that they are often a labor of love, and unpaid.

3.2 The Era of the 'Open Source Economy': Be Good and Compete

The arrival of 'Open Source' on the markets has been, according to some observers, the vindication of 'technological convergence' – a by now somewhat paradigmatic slogan in IT circles. This convergence means the coming together and synergetic build-up of various technologies, which up to now had been separate, and were developed in separate R&D environments.

Within these – often extremely rapid – transformations, the creation of open standards has merely marked a new phase in the 'war of all against all' that is also known as 'free trade', and that has 'co-operate on the standards, compete on the solutions!' as motto. This is also IBM's catchword, which is one of the largest players in this field. When even 'Big Blue' is willing to co-operate, you know the cake must be worth it...

Indeed, for many firms, F/OSS solutions have become one of the few ways left to compete successfully against monopolies (and consolidated oligopolies), and to escape classic style competition, which due to ever increasing investment costs is no longer a viable proposition for many smaller companies. But with F/OSS in hand, firms can lower their development costs, and hence the 'price' of their services. Firms have now been familiar for a long time with the dynamic advantages of networked development and network partnerships: it is a well-known fact that a network's worth goes in the square proportion of its nodes.[19] The larger the network, the larger the profits, and exponentially so.

19. According to Metcalfe's law the value of a network grows exponentially with the numbers of machines connected to it. Hence each additional computer that is connected to the network, on one side takes advantage of the network's resources, on the other contributes new resources to it and this in turn increases the overall value of the network itself. This means that 1) the number of possible connections or meta-connections of a network increases exponentially with each new computer (hence the strategic importance of links within a network); 2) the value of a community increases exponentially with the increase of its members (the strategic value of virtual communities). Robert Metcalfe formulated this law at the end of the 1970s. See, http://en.wikipedia.org/wiki/Metcalfe%27s_law.

F/OSS can offer a number of interesting guarantees for the development of high added value networks: on the one hand it allows the software to remain, in a certain sense, a 'public good' (since it follows an open path of development and benefits from community support); and on the other hand, it helps reduce the migration, or 'switching' costs, from one system to the other, especially in the case of switching from proprietary models to 'free' models, but even more so, in the case of 'legacy' issues (abandoning obsolete platforms). When adopting new technologies, the major expenses reside in the formation of the users, not so much in the costs of acquiring the technology itself (certainly not in the case of outstanding software carrying next to no price-tag). However, the greatest boon (even though it is difficult to quantify) resides in the creation of an entirely new and attractive image for the firm that F/OSS and its products.

The performances and success of F/OSS have led to various attempts to put its format in practice in various other sectors. Such attempts inevitably went hand in hand with the use of exalted formulas such as 'Open Law', 'Open Science', or even 'Open Society' (even though this term had been coined by Karl Popper much longer ago). Today, the idea of an 'Open Source Society' has almost become the paradigm for a new epoch, dedicated to the collaborative search of common means to achieve a 'politics of what is feasible'. 'Open Source Society' indeed is meant to consist of an 'open code' dispensation of which the possibility to provide input for improvement is freely available to all. When expressed in such terms, one can only agree. However, one might be surprised by the ease with which such a concept, whose origins lie in a very precise technical, and IT related context, has been metaphorically 'translated' to philosophical, economic, and societal domains, without very much thoughts being given to modifying or adapt it to the demands of its new usage.

In the branch of the IT industry in which it was born and put into practice, F/OSS, and more specifically, 'Open Source' has also led to market competition: the battle for the best brains, a race for the lowest costs, venture capitalism, and mergers and acquisitions to the tune of billions of US Dollars. We have to do here with large markets on which capitalism organizes itself in a nimbler and more 'democratic' way. A business dynamism that is no longer bent on submitting the labor force, but on intimately associating workers with the 'mission' of the enterprise, that in itself is increasingly becoming equated with the realization of individual desires.[20]

Amidst ever so many firms surfing this wave in the pursuit of various benefits, Google stands again out as the one which sets the tune: 'don't be evil', avail yourself of F/OSS, it's free, it's better than proprietary software, and its developers are proud to be part of it. The Googleplex has shown how

20. To be sure, compared to the Italian context where IT companies are still informed by an outdated Fordist logic of mass production, Google-style capitalism may seem a 'democratic' improvement. Yet, as we do not believe in sustainable development, ethical consumption and the tale of green capitalism, neither do we condone the exploitative co-optation of the workforce practiced by Googleplex. It is not a question of ideology, but of common decency; the ultimate aim of capital is not the full realization of the creative potential of human beings, but endless accumulation by any means necessary. Richard Sennett works in non-fiction, and James G. Ballard's in fiction, shows how abundance capitalism's extreme consumerism, i.e. anarcho-capitalism, may well be the first step towards a new Fascism.

this strategy of deep penetration in people's everyday life has been refined into a fine art: happy, rewarded, and encouraged creative employees, produce far more and far better than oppressed workers do.

3.3 Seducing the Hackers: Autonomy, Easy Money, Free Tools

Google's F/OSS exploitation peaks in 2005, just as the firm's reputation hits low tide due to its competitors' moves and some murky judicial affairs, as we've seen in Chapter 1.

Even though Google's business model was firmly rooted in IT culture and the practice of scientific excellence, the mere usage of the GNU/Linux operating system to run Google's humongous data center(s) was not enough: a stronger initiative was needed to strengthen further the faith in F/OSS, and to have attention turned to it again amidst a by now disparate mass of free production networks. On the other hand, developers could no longer be seduced just by providing an 'authentic h4x0r'version of the site – or a Klingon one. And the intellectually elitist attitude of the in-house academic brains started to wear thin on investors.

They expect substantial returns on their investments and are less interested in the cult of excellence, meritocracy, and academic arrogance, even though their outcome is an invariably outstanding quality of products. It was therefore unavoidable that the period in which the two founders friend could jokingly quote shares and do a wager on the stock exchange for US$ 2,718,281,828 (being the mathematical constant 'e') would come to a close. It would no longer be acceptable to make completely 'crazy' moves, like the one in August 2005, when they declared to have sold 14,159,265 Google shares in order to rake up US$ 4bn in liquidity, without telling the investors nor explaining what they intended to do with that money.

A bold strategic move was called for in order to realize Google's aim to invest in research, and to demonstrate that it is possible with such a strategy, to be outstanding quality-wise, and at the same time competitive on the markets. This move was to be targeted not so much at the 'average user', but at the 'young brains' who have the future and the promise of innovation as their targets. By giving these young brains the tools and means, and by signing agreements with other firms in the same sector, they meant to create and nurture a community. In other words, the F/OSS world was to be brought under Google's spell.

Google's plan to sponsor F/OSS communities got serious in October2005: Oregon State University and Portland State University were granted US$ 350,000 to improve the quality of their F/OSS development projects, and to spawn new software. Shortly afterwards the 'Summer of Code' program was inaugurated with a splash; PR was made directly on Google's home page, and is still accessible at http://code.google.com/summerofcode05.html.

The message was loud and clear: the best were to be concretely rewarded. Each coder that could up with a new F/OSS projects or with a substantial improvement to an existing one, was to receive US$ 4,500. The whole operation was meant to be perceived as one big shower of love for F/OSS of course, as it emphasized that this was the strategic ground where innovation was happening.

Also, the sympathy of young developers was to be courted by offering them a cash incentive. And finally, Google was seeking to create a real, 'open' style community, which it would sponsor.

More than 400 young developers ended up with a reward. Most were students, and the majority had made improvements or introduced new features in already existing projects, rather than having developed entirely new software packages. They had added all kinds of features to software suites like Apache, Fedora, Gaim, Inkscape, jabber, KDE, Mozilla, OpenOffice, Python, Samba, Gnome, Mono, Ubuntu – and even Google. There were quite some successes among them, and these were especially advantageous for the firms that were going to benefit as owners of these projects: IBM, RedHat, Mozilla.com, Sun Microsystems and Hewlett Packard.

A number of these projects, together with those that were developed within the famous 20% Google time, contribute towards achieving the second goal of the firm's plan to team up with the F/OSS world: they provide for development tools and means. By 2002 Google was already offering freely downloadable tools on its site. Today, the dedicated page hosts proprietary projects developed by Google teams as well as the winning projects of the Summer of Code which are not linked to Google's own products or services.

The 'Code' section of the site presents a number of projects by software developers that are devoted to the most diverse programing languages (Java, C++, Python, etc.). Making development tools available is absolutely essential if you want to stimulate the creation of software and the forming of communities, because the investment is directly linked to the instruments that are necessary for that purpose. Those projects that are developed by Google's own coders are called Google APIs, and are proprietary libraries to ensure they have the right interface and that they run Mountain View's colossus principal services.

A computing library is a collection of shared subroutines and compiled portions of code that provide services to other, independent softwares that need simplified functions. An eloquent example are the graphic libraries GTK and QT, which make use of the standard visual applications like buttons, menus and icons, that make the work of coders easier. Coders will then go to their favorite libraries and will need to write only those lines that are unique to the software. The libraries will take care of the buttons, the mouse's moves, the inking of shadows; in short, it takes care of everything we, as users, are accustomed to. Given the fact that the average coder will be less than enthusiastic about doing all this dreary work her or himself; graphic libraries are an essential link between various projects. On the one hand, they lend a certain graphic homogeneity to the different applications, and on the other hand they enable coders to concentrate on the real work without losing time creating interfaces.

There are development communities that take care of libraries in order to provide for generic and transversal tools that are needed for solving complex tasks (network connections, communication between applications, word processing, image compression, etc.). Similar to how a software suite is made for reaching out to as many users as is possible, a library is there to be used by the maximum number of developers.

Libraries allow coders to create software starting from an assemblage of shared resources, that function as 'de facto' standards. Making use of existing libraries while programming means to benefit from a basis that is already very large and complex, and that uses existing code in the most effective way, and allows for a layering of competences. Libraries therefore represent a strategic asset both in the dynamics of spontaneous F/OSS co-operation as well as in the relational economy oriented world of 'Open Source'.

Google libraries (the Google APIs) run under a proprietary license, hiding to programmers their actual mode of functioning. And, what's more, they also include a special control device, since the developer who downloads libraries for free needs to authenticate her/ himself by way of an identifying code. This enables Google to trace in an invasive manner all moves and all changes that are made subsequently to the use of its APIs. Coders making use of these libraries are allowed to integrate Google search in their site and to know its PageRank[TM] ranking in real time. They can also make use of software that manages advertisements through AdWords, or generates dynamic maps of their data with the Google Maps interface. In short, they can deploy Google services as they like, making use of the programming language of their choice, and all this under the watchful eye of Mountain View. This also holds for Google Android Platform, and for developers using Android's API.

The vast diffusion of Google services goes together with the possibility to personalize them down to the minutest detail. It is possible, by writing appropriate XML documents, to establish bridges between the various Google services. For instance, all elements of Google's home page may be tweaked to one's preferences, as if it were an application. The same possibilities exist for Google Earth: one can install 3-dimensional surfing on satellite images, or one can highlight geographical areas, or buildings, or weather data.

All these tools, which are intended for those who know how to write code – at least in one language – are essential for the creating of new combinations of programs, or simply for using whatever Google makes (at least partially) public in its applications.

All the facilities offered to us by the Google libraries carry with them two strict rules that have to be respected: registering and licensing. In order to activate the functions of the Google API, you first need to request a key that functions as an access code, and you have to mention exactly to which purpose you wishes to employ it. Only then are the APIs activated. The second requirement is the license. These APIs are not under copyleft: they can only be used up to a certain extent: it is mandatory for instance, to have a Google account, as the hunger for gathering more information never stops; moreover, the maps are the exclusive property of Google (or of an third party), an may under no circumstances be altered. And of course, in case of commercial use, an agreement must first be entered into. The activation code enables Google to retain total control over the new programs that come about by making use of the APIs. Google can block these applications without giving any reasons, or it can simply control either the way they access its services, or the way in which they are being used. All of this can be attributed to the fact that the source code is not public and not free, making it impossible to understand the internal working of the libraries.

Besides the advantage of having people develop things for free, while keeping full control over these developments, Google has another good reason to foster the creation of communities along this somewhat bizarre formula, which we can call 'quasi-open'. It can, namely, also be put to use to compile even more data, to do research, or to sell statistics.

However, to welcome and host individual developers' projects for free also means having to obtain their trust. Allowing people to search the database of ongoing projects without restrictions amounts to triggering a solid chain of users to emerge. Moreover, such a costless incubator of young talent secures the availability of a pool of highly motivated human material whose formation, one of the major cost items in the IT sector, has already been taken care of in an autonomous fashion, and in a way that is in complete alignment with the style of the firm. The offering of development tools in the form of a 'talent scouting' mechanism has been known for a long time: it is, for instance, the battle horse of a few robust IT market players such as the Va Software Corporation, which puts extremely powerful computers at the disposal of the F/OSS community for free, together with unlimited bandwidth, memory space, and even technical assistance of a kind that is beyond reach to the most. There are two digital Valhalla's that may claim worldwide fame for a number of project hosted far above that of any competitor: sourceforge.net and freshmeat.net – and both are property of Va Software. The appeal of such portals is so big that even very small projects appearing on their front pages will attract hundreds of unique views.

Thus, all the ensuing applications will have Google's visibility together with all the services offered by the Va Software colossus: discussion forums, mailinglists, debugging tools and machines, control devices such as CVS (Concurrent Versioning System), controlling the versions, editions and changes made to the code.

It is not difficult to imagine how Va Software can offer an outstanding 'business to business' service to companies that are active in the domain of F/OSS - and not only to those - with data bases used for free by thousands of coders at its disposal,. Its data mining represents a virtual heap of gold in the feverish world of billion Dollars deals. RedHat, Microsoft and many other corporate heavies are among the advertisers and sponsors of sourceforge and freshmeat.

There are many ways of bringing F/OSS developers and firms that are interested in F/OSS together. Google can profit from the advancement of its products being done by hundreds of users, and this at next to no costs. It also profits from the organizing of talent competitions such as the 'Summer of Code', which serve both the development and the advertising of its services. And finally we see extremely dynamic methods of recruitment: Google even practices video-hiring at Google Video and YouTube, where enthusiastic employees and Sergey Brin himself will tell you all the benefits of working for Mountain View.

3.4 Hybrid Worlds of University and Enterprise

With the benefit of hindsight, the coming together of Google and the world of F/OSS would appear to be very much a strategic and calculated move, despite a commonness of origin and purposes regarding the dynamics of collaboration among F/OSS communities which emerged

from the academic/ scientific scene. The accumulation strategy we discussed earlier is at work even here: Google operates a bit like a black hole, using, even fostering, open codes in order to subsequently suck them in and integrate them into its business. A number of changes that Google engineers have made to open up tools have never been made public for instance. This also applies to their server GWS (Google Web Server) which is a modified version of Apache, the most widespread F/OSS server of the Web. This amounts purely and simply to availing oneself of the potentials and realizations of the open development formula without sharing developments and improvements afterwards.

An important factor in the relations between Google and the F/OSS world is the fact that it had its origins in Stanford, a university well known for its capacity to spawn aggressively and competitively, high quality research-backed start-ups. Despite the fact that Stanford did constitute – and still does so – an environment very favorable to F/OSS development projects – especially when they are business oriented – the narrow links that exist with venture capitalism and anarcho-capitalism make it rather difficult to pursue purely academic excellence once one has left the campus behind. Stanford, as one of the most important universities in the Silicon Valley, can be also be considered to be the cradle of the nerd suprematism attitude, as Ippolita accounts in the essay *In the Facebook Aquarium. The Resistible Rise of Anarcho-Capitalism* (forthcoming).

A small digression on academic research, US style, is needed here to shed light on the intertwined origins of Google, the F/OSS world, and what could be termed right-libertarian profit-oriented research. On a more general plane, universities in the USA are remarkably intent on capitalizing on intellectual creation: the custom is that a university will retain the copyright on the results of all research projects that were developed within its walls. Universities in the United States are historically connected to business, and are often real businesses themselves. Patents that originate from universities and that are claimed by its researchers bring benefits in all kinds of ways, besides enhancing the prestige of research centers, their staff and students. These universities constitute hybrid environments that are public and private at the same time. Up until the year 2002, public universities were not allowed (in theory at least), to patent their inventions, and the same applied to publicly funded private research labs (often at – private – universities). Rights payments impede the free circulation of knowledge in scientific research and makes reproduction, verification and/or invalidation of experimental results difficult. This was based on the 'Experimental Use Defense', a legal principle dating from 1813 that allowed for the free usage of patented technology in experimental research. This jurisprudence was quashed in 2002, when Madey met Duke University in court. John Madey had sued his own university because it made use of a device he had patented to conduct research on free electrons. The Federal Circuit Court of Appeals ruled that the 'Experimental use Defense' was intended to protect a scientist who is engaged in research in a free and financially uninterested way, but that within universities such activity was obviously no longer to be considered so innocent, since, even in case there was not a direct commercial connection at stake, it still could be considered akin to a 'legitimate business', because it generated funding and benefited the research personnel and the students being educated. And so, any distinction between research for public and research for private goals was made to disappear.

Naturally, all projects conducted at Stanford are patented by the university, and this mixture of incentives bestowed on F/OSS projects on one side, and with a mad run on patents on the other, does not sit well with the ideal, let alone the practice, of 'research for its own sake', as is being trumpeted by Google as its strength and its pride.

The issue of patents becomes even more interesting when considering the fact that Google's success primarily rests on an algorithm invented by Larry Page in collaboration with Sergey Brin, at a time when they both were still researchers at the Computer Sciences Faculty of Stanford. The algorithm that revolutionized the indexing of the Web is hence the property of Stanford, subjected to a regular patent. In the next chapter(s) we will look into how this prodigy functions, how it manages to return results in less time than any competitor does, as if it is able to give each and every user 'exactly what she wants'.

CHAPTER 4. ALGORITHMS OR BUST!

4.1 Google's Algocracy Rules in Performance Societies

Google's mind-boggling rate of growth has not at all diminished its reputation as a fast, efficient, exhaustive, and accurate search engine: haven't we all heard the phrase 'if it's not on Google, it doesn't exist!'; together with 'it's faster with Google!'. A Better Performance is a key-value.

In 'performance societies' human decision-making blends into the power of algorithms, the Algocracy. Individuals, groups and societies delegate the establishment of links between things to algorithms that are not of their own making. The IoT (Internet of Things) is the new chimera of an automated sociality. Imperceptibly, we are quickly moving from a world rich with meaning because of relationships built by and for us, into a world whose meaning is derived from correlations unearthed by machines and managed by algorithms. Performance Societies are not disciplinary impositions, but much more effective systems of domestication of humans than previous anthropotechnics. At the micro level, individuals need an adequate income, are required to increase their personal and collective consumption, are urged to improve their health, are encouraged to have more friends, etc. These societies have been made possible by the constant improvement of measurement systems and the massive dissemination of real-time data integrated into a comprehensive system of information management. As a result, all information provided by individuals, whether voluntarily or not (tracking, profiling and other data mining techniques), are recorded and stored to form the infamous Big Data, managed by other algorithms.

It is not surprising that at the core of Google's success lies, besides the aspects we have discussed earlier, the PageRank[TM] algorithm that was mentioned in the introduction, which steers Google's spider's forays through the Net. Let's now look more closely at what it is, and how it works. As we will see further in Chapter 7, it is a typical technocratic delegation.

4.2 Algorithms, or the 2.0 Liturgy and Real Life

An algorithm[21] is a method to resolve a problem, it is a procedure built up of sequences of simple steps leading to a certain desired result. An algorithm that actually does solve problems is said

21. 'Algorithm: a set of rules that precisely defines a sequence of operations.' Cf. https://en.wikipedia.org/wiki/Algorithm. The term, from ancient Greek arithmos, i.e. number, derives then from al-Khwarizmi, an Arab mathematician of the ninth century. Muhammad ibn Musa al-Khwarizmi introduced the use of Arab numerals in mathematics. His book Kitab al-Jam' wa-l-tafriq bi-hisab al-Hind ('The Book of Addition and Subtraction According to the Hindu Calculation') was translated in Latin as 'Algorismi de numero Indorum' thus introducing the use of Indian system of numeration, namely the decimal positional number system to the Western world. Hence procedures which allowed calculations in decimal notation were called algoritmi which is the Latin rendering of Al-Khwarizmi, and this in turn, led to the term 'algorithm'.

to be accurate, and if it does so speedily, it is also efficient. There are many different types of algorithms, and they are used in the most diverse scientific domains. Yet, algorithms aren't some kind of arcane procedures concerning and known only to a handful of specialists; they are devices that profoundly influence our daily lives, more so than it would appear at first sight.

Take for instance the technique used to tape a television program: it is based on algorithms; but this also holds for methods to put a pile of papers in order, or to sequence the stopovers of a long journey. Algorithms regulate the cadence of online liturgy, which in turn is strictly related to real life. Algorithm come from Arabic (al- is the article), but before from ancient Greek arithmos, i.e. number. Liturgy also is from Greek leitos (public, for the people) – ergon (work, service).

Originally, as also Aristotle reports, liturgies were all the public works. Then, in classic Athens (5th century B.C.), liturgies were also intended as taxes. For example, wealthy citizens financed the public representation of tragedies and satyr plays that were open to all the people. Finally, only the priestly service was named as liturgy, and this is the modern signification of the term. Sacred liturgies are a series of simple steps, executed by priests, leading to a desired result. Take some bread, says some words, and it will become the body of Christ in front of the attending people. The core is the correct repetition of the steps within the time.

It sounds like rhythm.

The Web experience came into existence thanks to the rhythm of algorithms. In fact, there is a connection at the level of experience. Algorithms are the procedures that pace the online liturgy, and very often without conscious interaction of users. You don't know how it works, but it works. Algorithms make things happens. PageRank feeds the Google results. EdgeRank and GraphRank feed the Facebook news results and connections. Amazon algorithms feed suggestions about books we should have to read. Apple Store suggests what music we should have to buy and listen, and the same goes for Grooveshark. We feed these algorithms with our free online work: this is the kind of unconscious autopoiesis Ippolita is very critical about.

Within a given time, by going through a number of simple, (re)replicable steps, we make a more or less implicit choice of algorithms that apply to the problem and solve the issue at hand. 'Simple' in this regard, mostly means 'unequivocal', readily understandable for those who will put the algorithm to work. Seen in this light, a kitchen recipe is an algorithm: bring three liters water to the boil in a pan, add salt, throw in one pound of rice, cook for twelve minutes and serve with a sauce to taste'; all of this is a simple step-by-simple step description of a cooking process, provided the reader is able to correctly interpret elements such as 'add salt', and 'serve with a sauce to taste'.

Algorithms are not necessarily a method to obtain completely detailed results. Some are intended to arrive at acceptable results without concern for the time factor; others arrive at results by taking as few steps as possible; and yet others focus on using the fewest amounts of resources.[22]

It should also be stressed that nature itself is full of algorithms. Algorithms really concern us all because they constitute concrete practices meant to achieve a given objective. In the IT domain they are used to solve recurrent problems in software programming, in designing networks, and in building hardware. Since a number of years, due to the increasing importance of network-based reality analysis and interpretation models, many researchers have focused their studies on the construction methods and network trajectories of the data that are the 'viva materia' of algorithms.

The 'economy of search' John Battelle writes about, part of the wider Performance Societies, has become possible thanks to the steady improvement of the algorithms used for information retrieval, that were developed in order to augment the potential of data discovery and sharing, and all of this with an ever increasing degree of efficiency, speed, accuracy, and security. The instance the general public is the most familiar with is the 'peer-to-peer' ('P2P') phenomenon: instead of setting up humongous databases for accessing videos, sound, texts, software, or any other kind of information in digital format, increasingly optimized algorithms are being developed all the time, facilitating the creation of extremely decentralized networks, through which any user can make contact with any other user in order to engage in mutually beneficial exchanges.[23]

4.3 The Strategy of Objectivity

The tremendous increase of the quantity and quality of bandwidth, and of memory in our computers, together with rapidly diminishing costs, has enabled us to surf the Internet longer, better, and faster. Only twenty years ago, modems, with just a few hundred bauds (number of 'symbols' transmitted per second) of connectivity, were the preserve of an elite. Today, optic fiber crisscrosses Europe, as well as hi-speed Wi-Fi connections, carrying millions of bytes per second, have become technologies accessible to all.

Fifteen years ago, a fair amount of technical knowledge was required to create digital content. Today, the ease with which one can publish on the World Wide Web, the omnipresence of e-mail, the improvement of all kinds of online collective writing systems, such as social networking

22. The best way to reach Paris might be to take a direct flight from the closest airport to where you live, but you can also go to that same airport and board the first available flight, and once you reach its destination board another one and continue until you finally land in Paris. Both methods are effective, obviously the first is probably cheaper, the second though may give you the opportunity to visit the main European airports. In other words, different algorithms describe different possibilities.
23. Peer-to-peer (or P2P) is usually a network of computers or any network that instead of clients or servers, has a number of equally privileged nodes that are clients and servers at the same time. This network model is the opposite of the hierarchical client-server model, where one only provides services (server) to the passive receiver (client). With this kind of arrangement each node can initiate or complete a transaction. The nodes involved may differ in terms of their local configuration, their processing speed, or in the amount of stored data. A classic example of P2P is a file sharing network.

platforms, blogs, wikis, portals, mailing lists – all these developments, together with the dwindling costs of registering Internet domains and addresses, have profoundly changed the nature of users. From being simple users of information, which was made available to them by IT specialists, they have increasingly become the creators of information themselves.

The increase in the quality of connectivity goes together with an exponential augmentation of the quantity of data send over the networks, which, as we have pointed out earlier, entails the introduction of better performing search instruments. The phenomenon that represents this pressing necessity exerts a deep attraction on social scientists, computer science people, ergonomists, designers, specialist in communication, and a host of other experts. On the other hand, the 'informational tsunami' that hits the global networks and make them 'social' cannot be interpreted as mere 'networkization' of societies as we know them, but must be seen as a complex phenomenon needing a completely fresh approach. We therefore believe that such a theoretical endeavor cannot be left to specialists alone, but demand a collective form of elaboration.

If indeed the production of DIY network constitutes an opportunity to link autonomous realms together, we must also realize that the tools of social control embedded in IT technologies represent a formidable apparatus of surveillance and repression.

The materialization of this second scenario, which is most spectacularly exemplified by the Echelon eavesdropping system[24], unfortunately looks very probable, given the steadily growing number of individuals who are giving information away, and sharing it without thinking on proprietary platforms, as opposed to an ever diminishing number of providers of search tools. The access to the information that is produced by this steadily growing number of individuals is managed with an iron hand by people who are both retaining the monopoly over it while at the same time reducing what is a tricky social issue into a mere marketing free-for-all contest where the best algorithm wins.

A search algorithm is a technical tool activating an extremely subtle marketing mechanism, as the user trusts that the search returns are not filtered and correspond to choices made by the 'community' of surfers. To sum up, a trust mechanism is triggered into the objectivity of the technology itself, which is recognized as 'good' because it is free from human individuals' usual idiosyncratic influences and preferences. The 'good' machines, themselves issued from 'objective' science, and 'unbiased' research, will not tell lies since they cannot lie, and in any case don't have

24. ECHELON is a name used in global media and in popular culture to describe a signals intelligence (SIGINT) collection and analysis network operated on behalf of the five signatory states to the UKUSA Security Agreement (Australia, Canada, New Zealand, the United Kingdom, and the United States, referred to by a number of abbreviations, including AUSCANNZUKUS and Five Eyes).It has also been described as the only software system which controls the download and dissemination of the intercept of commercial satellite trunk communications. Originally directed at the Soviet Union, it is supposedly directed against global terrorism. It can intercept and analyze phone calls, e-mails etc. throughout the world. Cf., Duncan Campbell 'Inside Echelon' at http://www.heise.de/tp/artikel/6/6929/1.html.

any interest in doing so. Reality, however, is very much at variance with this belief, which proves to be a demagogic presumption – the cover for fabulous profits from marketing and control.

Google's case is the most blatant example of this technology-based 'strategy of objectivity'. Its 'good by definition' search engine keeps continuous track of what its users are doing in order to 'profile' their habits, to then exploit this information by inserting personally targeted and contextualized ads into all their activities (surfing, e-mailing, file handling). 'Lite' ads for sure, but all pervasive, and even able to generate feedback, so that users can, in the simplest way possible, provide information to vendors, and thus improve the' commercial suggestions' themselves by expressing choices.

This continuous soliciting of users, besides flattering them into thinking that they are participants in some vast 'electronic democracy', is in fact the simplest and most cost-effective way to obtain commercially valuable information about the tastes of consumers. The users' preferences and their ignorance about the mechanism unleashed on them) is what constitutes and reinforces the hegemony of a search engine, since a much visited site can alter its content as consequence of the outcome of its 'commercial suggestions': a smart economic strategy indeed.

Seen from a purely computer science point of view, search engines perform four tasks: retrieving data from the Web (spider); stocking information in appropriate archives (databases); applying the correct algorithm to order data in accordance with the query, and finally, presenting results on an interface in a manner that satisfies the user. The first three tasks each require a particular type of algorithm: search & retrieval; memorization & archiving; and query.

Google's power, just as Yahoo!'s and other search giants' power on the network is therefore based on:

1. A 'spider', which is a piece of software that captures content on the net
2. An enormous capacity to stock data on secure carriers (data center), and a lot of backup facilities, to avoid any accidental loss of data.
3. An extremely fast system able to retrieve and order the returns of a query, according to the ranking of the pages, for every kind of device in every situation.
4. An interface at the user's side to present the returns of the queries requested. Cloud computing is the logical 'evolution' for gigantic data-center interfaces. Google Desktop and Google Earth, however, are software that the user must install on her machine beforehand.

4.4 Spiders, Databases and Searches

The spider is an application that is usually developed in the labs of the search engine companies. Its task is to surf web pages from one link to the next while collecting information, such as document format, keywords, page authors, next links. When it finishes these exploratory rounds, the spider software sends all this information to the database to archive it. Additionally, the spider must monitor any changes on the sites it visits so it will be able to schedule its next visit and stock fresh data.

There was a time in which the Google spider managed two types of site-scans: one monthly and elaborate scan, the so-called 'deep crawl', and the other daily, 'fresh crawl', for updating purposes. Nowadays, the crawl has changed, but the goal remains the same: keeping Google's databases continuously updated as the spider surfs its network.

After every 'deep crawl', Google needed a few days to actualize the various indexes and to communicate the new results to all of its data-centers. This lag was known as the 'Google Dance': the search returns used to be variable, since they stemmed from different indexes. However, Google has altered its cataloging and updating methods from 2003 onwards, and we consider the so-called filter bubble that has been in place since 2003.[25] Google has also spread them much more in time, which has resulted in a much less pronounced 'dance': today, the search results vary in a dynamic and continuous fashion, and there are no longer periodic 'shake-ups'. In fact, the search returns will even change according to users' surfing behavior, which is archived and used to 'improve', that is, to 'simplify' the identification of the information requested.

The list of choices the application is working through in order to index a site is what constitutes the true force of the Google algorithm. And while the PageRank[TM] algorithm is patented by Stanford, and is therefore public, later alterations in order to filter and match user-generated profiling have not been publicly revealed by Google, (nor by any other search engine company). And the back-up and recovery methods used in the data centers are not being made public either.

Again, from a computer science point of view, a database is merely an archive in digital format: in its simplest, and up until now, also in its most common form, it can be represented as one or more tables which are linked together and which have enter and exit values: these are called relational databases. A database, just like a classic archive, is organized according to precise rules regarding stocking, extraction and continuous enhancement of the quality of the data themselves (think recovery of damaged data, redundancy avoidance, continuous updating of data acquisition procedures, etc.).

IT specialists have been studying for decades now the processes of introduction, quality improvement, and search and retrieval within databases. To this end, they have experimented with various approaches and computer languages (hierarchies rankings, network and relational approaches, object oriented programming, etc.). The building up of a database is a crucial component of the development of a complex information system such as Google's, as its functionality is entirely dependent on it. In order to obtain a swift retrieval of data, and more generally, an efficient management of the same, it is essential to identify correctly what the exact purpose of the database is (and, in the case of relational databases, the purpose of the tables) which must be defined according to the domains and the relations that link them together. Naturally, it also becomes necessary to allow for approximations, something that is unavoidable when one switches from natural, analog languages to digital data. The itch, however, resides in the secrecy

25. See Eli Pariser, The Filter Bubble. What the Internet Is Hiding From You. Penguin Press, 2011.

of the methods: as is the case with all proprietary development projects, as opposed to those that are open and free, it is very difficult to find out which algorithms and programs have been used.

Documents from research centers and universities allow a few glimpses of information on proprietary projects, as far as it has been made public. They contain some useful tidbits to understand the structure of the computers used and the way search engines are managing data. Just to give an idea of the computing power available, already in 2006 one would find descriptions of computers which are able to resolve Internet addresses into the unique bits sequences that serve to index in databases in 0,5 microsecond, while executing 9000 spiders 'crawls' at the same time. These systems are able to memorize and analyze 50 million web pages a day.

The last algorithmic element hiding behind Google's 'simple' facade is the search system, which, starting from a query by the user, is able to find, order, rank and finally return the most pertinent results to the interface.

Interestingly, a number of labs and universities have by now decided to make their research in this domain public, and especially their research regarding answers to problems that have been found, and the various methods used to optimize access speed to the data, questions about the complexity of the systems, and the most promising instances of parameter selection.

Search engines must indeed be able to provide almost instantaneously the best possible results while at the same time offering the widest range of choice. Google would without doubt appear as the most advanced search engine of the moment. However, as we will see in details in the next chapter, these extraordinary results cannot but be the outcome of a very 'propitious' form of filtering.

For the time being, it suffices to say that the best solution resides in a proper balance between computing power and the quality of the of the search algorithm. You need truly extraordinary archival supports and indexation systems to find the information you are looking for when the mass of data is written in terabytes (1 tb = 1000 gigabytes = 1000 raised to 3 bytes), or even in petabytes (1 pb= 1000 tb), and also a remarkable ability to both determine where the information is in the gigantic archive and to calculate the fastest time needed to retrieve it.

And as far as Google's computing capacities are concerned, the Web is full of myths and legends – not always verifiable nor credible – especially since the firm is not particularly talkative about its technological infrastructure. Certain sources are buzzing about hundreds of thousands of computers interconnected through thousands of gigantic 'clusters' sitting on appropriate GNU/Linux distros; others talk about mega-computers, whose design appears to come straight out of science fiction scenarios: humongous freeze-cooled silo's in which a forest of mechanical arms move thousands of hard disks at lightning speed. Both speculations are just as plausible or fanciful, and do not necessarily exclude each other. In any case, it is obvious that the extraordinary flexibility of Google's machines allows for exceptional performances, as long as the system remains 'open' - to continuous in-house improvements, that is.

4.5 From 'Brand Identity' to 'Participative Interface'

Search, archiving and retrieval of data are procedures so complex that under-standing them fully requires an amount of knowledge and explanation that are beyond the scope of this book. We will, however, look in detail at some aspects of their functioning. And we should, in any case, have a closer look at the interface since that is the element which is put forward and managed by Google as representing its core image, whereas algorithm performances and the database architecture are components that remain invisible to the user.

In the case of Google, The Interface is mostly the 'blank box'[26], the empty window where the user puts down his or her query, or 'search intention' on Google's universal homepage, which is designed in such a way as to exude welcome, reassurance, closeness.

The universal functionality of Google's homepage stems from it being iterated across 104 languages and dialects, and it being customizable in 113 different countries as per 2007. In some of those countries, the interaction model remains the same and unifies all search behaviors into one single, homogeneous format.

Going to Google's homepage, one first notices a linear interface with key elements, each with a very specific and universally recognizable function. This frame will accept search queries of various nature and complexity, from simple key words (e.g. 'Ippolita') to a more complex assemblage of words in brackets (e.g. 'authors collective'). It also allows for narrowing the search down to something more precise: to a particular site, or a specific language, or a particular domain, or only to documents in a specified format, and so forth (depending on the level of specificity one is aiming at). We can consider it to be an example of a successful interface, in so far that it manages to fulfill the ambitious goal of assigning a positive value to an otherwise white space in a page.

The interface presents itself without any adornment; it is almost empty, or rather, filled with only one empty element: the 'blank box', which reassures the user, and induces her/ him to activity. It wards off loss of attention and her/ him leaving the site due to either an absence of handles [i.e. something to hold on], or, conversely, because there are too many visual stimuli. This way, the confusion that often goes together with pages filled to the brim (suffering apparently from the 'horror vacui' syndrome; trying to be attractive with a flurry of banners, graphics, animations, etc., only to communicate anxiety to the user in the process) is avoided.

Actually, surfing is not really possible on a Google page: all its different components have a purely functional purpose. Their goal is to have the user access a service, and not to lead her/ him on a journey; their usage engenders behaviors which subsequently turn into routines of search, and

26. A 'black box' is a device that can only be described in terms of inputs and outputs but whose inner logic - how inputs are transformed into outputs - cannot be known. In the context of our discussion then, 'Black Box' refers to the mechanism whereby inputs are processed into outputs according to a logic inaccessible to the user. The concept of 'Blank box' refers to a somewhat similar method, but it does so implicitly, hence ambiguously; for though being an 'empty' space it is nevertheless charged with highly differentiated meanings and research functions.

become a default mode within a very short time. The interface is designed in such a way as to make usage, behavior dynamics, and expectation of the average user iterative. Thus, even after the introduction of the 'personalization' of a user, search comportments basically remain identical; so much that one can speak of a 'universal tool'.

The organization of texts and images is linear. It uses recurrent graphic elements, notable primary colors, and the images used are qualitatively homogeneous. The interface's display style is sober, to the point of austerity, despite the 'brand (and corporate) identity' the design reverberates. It is informed by a specific aesthetic, which appeals to very elementary, yet in their simplicity, very effective, properties of perception.

This almost instantaneous visual identification leads to a facility of use that is superior to Google's competitors' search engines. The level of ergonomic design achieved by Google is mind-boggling: it doesn't even need to present itself as a basket of services via its interface; its visual architecture screams that message already. The different services' interfaces are all autonomous, separate and largely independent from each other, and they all carry the 'blank box' as hallmark, and they are not directly linked to each other. It is for instance not necessary to go through various complicated steps to reach the code.google.com service dedicated to technicians of all levels, when you come from the site images.google.com, which addresses a much larger public. You need only to 'go deeper' in the google.com site, and know how to search. Despite this fragmentation, we are all able to recognize the network of services Google offers. Moreover, visitors are able to make use of the information sources in a combined and complementary manner. And this holds as equally true for the 'browse-only' types, as it does for those who have developed a mild – or stark – addiction to Google's services (a.k.a. 'Google-totally-addicted', joyfully jumping on the bandwagon of each and every Google novelty).

This decentralization of services results in a particular relational mechanism, since Google users do not discover these new sectors not necessarily through Google itself, but rather through the informal network of other users, on other sites, where Google visitors tell of their habits and discuss their tastes and preferences. Users then automatically 'localize' themselves within the extensive gamut of Google services, and this is something that happens as soon as they log in to a new service: for instance, the appropriate language will immediately be offered based on the geographic location of the user's IP address. It is also easy for Google to approximate the type of users at which a particular service is directed, to evaluate what level of technical knowledge it will require, or to what extent there exists an affinity with other users of the same service. Thus, the ear-say mechanism becomes akin to a 'relationships-based informal PageRank' system.

A first approximation would be to say that there exists a local relational dimension, in which the ear-say, 'by word of mouth' communication, concerns friends and acquaintances, together with a typological dimension of relationship, which is about particular classes of users who can be identified by means of statistical parameters (age, sex, occupation, etc.), and who use a particular service and thereby introduce a particular type of relational economy.

It would appear that Google also escapes falling victim to the ten problems relating to the use of websites as discussed by Jakob Nielsen, who is one of the most prominent specialist of user interfaces.[27] Although written in HTML language, Google's site is completely outside standards, and yet manages to be fully readable [i.e. compatible] with all browsers (either graphic or linear) that are in use today. In fact, Google has become the web standard, also because of its Chrome browser.

The neat graphic design of the Google homepage is further enhanced by an excellent visual organization of its commercial aspects. There are no advertisement links or whatsoever at the home page or in the documentation/information pages. Ads are only on display when a query is returned, and they are clearly separated from the results, even though they are related to the matters the query was about. One can therefore say that Google is able to arrive, via the workings of its interfaces, at an acceptable compromise between the respect towards its users and the necessity of economic returns. Advertisements (which are Google's main source of income) are displayed in such a way that they are not invasive and that they do not distract users from their usage of Google's services. Advertisement links are sponsored in a dynamic fashion, adjusting to the user's trajectory within the search site firstly, and secondly to the Internet in general.

Commercial links are thus not static; they move along with the users' searches. This is made possible by the RSS-feed (for RDF Site Summary, or Really Simple Syndication), which is one of the most used formats for the distribution of web contents, and also thanks to the many different digital information (re)sources (dailies, weeklies, press bureaus) Google is using to dynamically modify its homepage, when it has been personalized by a user. Google allows for registered users to completely configure their Google start page through the addition of a RSS-feed, and this makes it possible to check the weather forecast for the cities of one's choice, or to go through the history of previous searches, and all this at one's fingertips. To this, you can also add the widespread use of Android apps: bookmark management, keeping track of the last incoming e-mails, mashing-up a number of services: it all becomes possible, however, it should be noted that it also checks your non web-related computer files thanks to the 'Google Desktop' application. The commercial promotion mechanism (i.e. ads), the services and sophisticated profiling of users appear to constitute a coherent whole, both at the aesthetic and at the content level. And with the way in which they present themselves, sponsored links are nothing more than suggestions, even though they are graphically compatible and conceptually cogent with the search operation in progress. Google's economy is so well integrated into its interface that it can vanish without seeming to do any harm from the vantage point of users who are not interested, while generating handsome profit from users who do show interest in the suggested commercial link-ups.

27. Jakob Nielsen, a Danish computer scientist, is an authority in web usability. Among other things, Nielsen is well known for his disapproval of the excessive of graphics and animations (Flash for example) afflicting many popular websites at the expense of their usability, especially on the part of users with disabilities.

Yahoo! and many other search engines and portals offer the same sort of facilities to personalize their home pages. Yet the quality and quantity of what Google has to offer has remained unchallenged to this very day. The threshold of attention on the Web is notoriously low; pages are visited and then left within a very short time-span often not more than just a few seconds. Consequently, a user who 'invests' several minutes in a website, reveals, through her choices, a lot about herself and her habits as a consumer. This information is then carefully memorized by the company that owns the search engine (whether that is Google!, Yahoo! or another firm) and it comes to represent a true source of wealth produced free of cost by the user himself. This type of information is essential for the sponsoring companies that offer targeted products and services.

Home page personalization makes a site more attractive and intimate: the site becomes some sort of private tool in which the user goes on to invest time by choosing colors, tweaking its outlook, and selecting her favorite content. A recurrent (habitual) visitor who is able to configure his starting page participates in the construction of the web interface. Giving the user the freedom of choice and control over a few pages means transforming her from a simple target of advertisement into an 'intelligent' consumer, that is, a consumer you can extract 'intelligence' from. To foster interaction is surely the best, and yet subtlest, way of achieving 'fidelity'. This is why we see a stark increase in the amount of participative interface environments, for which ads are increasingly personalized in order to let us all enter together the golden world of Google.

4.6 PageRank[TM], or the absolute authority within a closed world

The algorithm that enables Google to assign value to the pages its 'spider' indexes is known as PageRank[TM]. We have already seen that PageRank[TM]'s mode of functioning is based on the 'popularity' of a web page, and computed on basis of the number of sites that link to it. Given an equal number of links, two different web pages will have a different PageRank[TM], according to the 'weight' of the linking pages: this is what constitutes the 'qualitative' aspect of sites.

To take a concrete example: quite often, when you check the access stats of a site, you will encounter a huge number of link-ups coming from pornographic sites. This can be explained by the fact that Google assigns ranking according to accessing links which appear in public statistics. Consequently, there are programs that exploit the invasive aspect of this connection and node evaluation logic in order to push up the ranking. And pornographic sites are well known to be pioneers in these types of smart experiments (they were the first on the Web with image galleries, and with on-line payment models).

While a number of software programs are looking for sites with the help of public access statistics, a very large number of links are actually established via bogus visits. These spawn from fake links on other sites that are most often pornographic. This devious mechanism literally explodes the number of visits to that site, causing its statistics to swell, and its (Google) ranking to lift up, which in last instance benefits the pornographic site issuing the fake link in the first place. It looks like a win-win situation, at least, where visibility is concerned. And it is not an 'illegal operation' either: nothing forbids linking up to an Internet site. This practice causes sites with public statistics to have a higher ranking than non-public stats sites.

This mechanism illustrates how Google's ranking's 'technological magic' and 'objectivity' are actually connected to the 'underground' of the Net, and is partially grounded on less savory practices.

Other, perfectly legit, practices have been documented that exploit Google's approach to indexation. An example would be Search Engine Optimization (SEO), which comprises a suite of operations that push up the ranking of a website in search returns. Getting to the #1 position, for instance, is often achievable by spamming from improbable addresses by automatic programs, and these have stupendous effects.

'We register your site with 910 search engines, registries and web-catalogs! We bring your site in pole position on Google and Yahoo! Try Us! No risk, just US$299 instead of US$349! – one shot, no obligations!'. Of course, confronted with these practices, Google still plays the transparency card: 'nothing can guarantee that your site will appear as #1 on Google'.[28]

Mathematically speaking, a feature of PageRank[TM], which is based on the analysis of links, is that the data base must be fully integrated, or in other words, that the search operations can only take place within a circumscribed, albeit extremely vast, space. That means that there is always a road that leads from one indexed web page to another indexed web page - in Google's universe, that is.

Searches therefore, will tend to be functional, by avoiding 'broken links' and returns that are substantially different from what had been archived in the 'cache memory' as much as possible. But the ensuing problem is that users will be falsely made to believe that Internet is a closed world, entirely made up of transparent links, without secret paths and preferential trajectories, because it would seem that, starting from any given query, a 'correct' response will always be returned.

This is the consequence of the 'Googolian' view of the Internet as being exclusively made up by the journeys its own spider makes as it jumps from one web link to the next one. If a web page is not linked anywhere, it will never appear to a user since Google's spider had no opportunity find, weight and index it. But this does in no way mean things like 'data islands on the Net' do not exist!

Dynamic sites are a good example of these data islands, since their functionalities are entirely based on the choices their users make. A typical example would be the websites of railways and airlines. Filling in the appropriate form will give you timetables, onward connections, the fastest itineraries and so on, for any destination in real time. Google's system is unable to grasp these forms' queries and hence does not index the results that have been dynamically created by the sites. Only a human person can overcome this hurdle. The only solution Google is able to provide is to redirect the user to the rail companies' or airlines' own sites when an itinerary, timetable or destination is asked for. The very same thing happens for social networking platform, such as Facebook, LinkedIn of Twitter, when users don't share their profiles with the entire Internet.

28. Email received at info@ippolita.net in May 2005. The position of Google on SEO: http://www.google.it/intl/it/webmaster/seo.html. For further technical details, cf., http://www.googlerank.com/.

This is the reason why the idea of the exhaustiveness of Google's databases must be challenged and discounted, as it falsely conjures up the notion of one unique universe for all of us; one that is complete and closed and is called 'Google'. However, the contrary is the case, as the act of mapping a trajectory in a complex network always means an exploration with only relative and partial results.

The dream of a Google 'which has a total knowledge of the Internet' is demagogic nonsense with the sole aim to perpetuate the idea that the information it provides is accurate and exhaustive, thereby elevating Google, as it were, into a unique, truth dispensing service – the Internet equivalent of the One Party System. Such an absolute fencing-off admittedly works well in everyday searches, because it speedily leads to results. However, in reality, within a complex networked system there is no such thing as an absolute truth; only a trajectory-induced evaluation, or even a time-induced one, depending on how long one wishes to spend on a (re)search.

The quality of a search is also entirely dependent on the subjective perception we have of the returns- on whether they are considered as acceptable, or less so. The networks we are able to explore, analyze and experience are complex objects whose nodes and linkages are constantly shifting. And if the decision on finding the results of a search acceptable or not in the end depends on the user, then the exercise of critical faculties is essential, together with a sharp realization of the subjectivity of her/ his own viewpoint. In order to generate a trajectory that is truly worth analyzing, it is necessary to presuppose the existence of a limited and closed network; we have to presuppose the existence of a world made up of only our own personal exigencies, while at the same time knowing full well that this is a subjective localization, neither absolute, nor remaining the same in time. To explore the Net means to be able to carve the Net up in smaller sub-nets for the sake of analysis; it amounts to creating small, localized and temporary worlds.

It turns out that in everyday practice, chance linkages are of utmost importance: the emergence of new and unexpected relationships can by no means be predicted by the analysis of the web's separate elements, like Google's ranking system suggests. These linkages fulfill the function of 'dimensional gateways' and allow for the lessening, or even the rank abolition, of distances between two nodes in the network.

4.7 PageRank[TM]: Science's Currency?

Contrary to common belief, the PageRank[TM] algorithm is not an original discovery by Google, but is based on the works of the Russian statistical mathematician Andrey Andreyevich Markov, who analyzed statistical phenomena in closed systems at the beginning of the 20th Century. Closed systems are understood as ones where each and every element is by necessity either the cause or the outcome of (an) other element(s) in that system. Sergey Brin's and Larry Page's work must have been based on this theory, although the further advances they made therein have not entirely been publicly disclosed, aside from the Stanford patent.

Maybe the best way to understand the nature of this algorithm is to look at what happens between friends. In a community of friends the more one talks about one shared event or experience, the

more it grows in importance, to the point of becoming something of common lore. If the knowledge about this given event is confined to a narrow circle, it will not become very famous. The same logic applies to celebrities, in the show business. The more they manage to be talked about, the more their ranking rises, the more famous they are, the more they become celebrities. This is the reason why there are so-many self-referential shows on television, such as 'Celebrity Farm' and others. Micro-celebrities are revamped with social networking, and Google uses the exact same mechanism to handle data.

However, Google is much more convincing in its image management as the company spreads the idea that Internet should be seen as a vast democracy, since the algorithm functions as if links were votes in favor of sites. And it doesn't matter whether the link speaks good or bad about a site; what matters is to be spoken about i.e. linked. The deception inherent to this 'global democracy' that was created by an algorithm is immediately obvious: as if democracy is something that emerges from technology and not from the practices of human individuals!

We have already stressed in Chapter 3 that the cultural origins of such a world view stems from the extremely elitist peer review system as practiced by scientific publications, where each researcher's contribution fits into a network of relationships, of evaluations and verifications enabling the communication and control of scientific research results. Google's 'global democracy' hence amounts to transferring the 'scientific method' of publishing on the Web by way of the PageRank[TM] algorithm, functioning as 'technological referee' that is able to objectively weight the information on the web and to order it according to the choices expressed via links used by the 'People of the Net'.

The likeliness is striking: on one hand we have scientific publications which acquire influence and authority in accordance with their rankings within their particular discipline, and this ranking is obtained by way of citations ('quotes'), , that is, by being cross referenced in the specialized literature. This is the way scientific research guarantees coherence: by ensuring that no new publication exists in a void, but instead functions as the 'current art' within the long history of scientific endeavor. And then on the other hand, we have web pages whose links are taken by Google's spider as if they are 'citations' which increase the status, and hence the ranking of these pages.

Scientific elitism, the prime mover of the awe which 'science' inspires, is curiously based on publication. Publishing by the way, i.e. making public, does by no means mean making 'accessible' or 'understandable'.[29] Indeed, it was the contention of sociologist Robert Merton in the seventies of the previous century that 'scientific discoveries', whether theoretical or experimental, cannot, will not, and should not be considered truly scientific unless they have been 'permanently integrated

29. That science is a sort of esoteric knowledge inaccessible to the uninitiated is a widely held view in our societies, as if only the experts can penetrate this citadel. Indeed, the expression 'it's not rocket science', used to stigmatize someone who seem unable to carry out simple tasks, is just an example of the reverence society tributes to science, as an intense intellectual endeavor that is only accessible to a select group of individuals. Cf. the activity of CAE, Critical Art Ensemble, www.critical-art.net.

into the body of scientific knowledge'. This statement might appear somewhat apodictic. After all, science in Antiquity was not at all 'publicly' transmitted – think of the Pythagorean School in ancient Greece, or of the distinction made between 'esoteric' and 'exoteric' writings, etc. But it does clearly demonstrate the eminently public character of modern day science.

Communication is therefore not a product derived from research, but the integral part of a form of knowledge based on accumulation and cooperation. Science, on one hand, strives for new results that would constitute an augmentation of the cognitive capital (at least since the 16th Century), but on the other hand, recognizes previous research as the necessary and unavoidable departure point of those. One can therefore initiate a history of scientific communication which would develop in parallel with that of its media supports: from the voluminous correspondence scientists used to maintain with each others, through the periodical publications in scientific reviews up to the electronic communication carriers of today. And it is not fortuitous that the first Internet nodes were academic research centers that had the need to communicate and share information.

Nonetheless, the evolution of carriers did not influence the basic tenets of the scientific method's mode of communication, which remains based on citations. Dubbed 'science's currency' in some quarters, citations function as tokens of honor given by scientists to the people who taught and/or inspired them. More concretely, it links present to past research, whether from the same, or from different authors. And indeed it makes sense to consider that the number of citations ('quotes') that a certain piece of research has attracted reflects its importance, or at least its impact, on the scientific community. With time, this system itself has become the object of specific research: bibliometrical analysis is a discipline which uses mathematical and statistical models to analyze the way information is disseminated, especially in the field of publications. In fact, bibliometry, and then especially its best-known indicator, the 'impact factor', is commonly used as an 'objective' criterion to measure an individual re-searcher's scientific output or that of an academic institution.

A vast archive of bibliometric data has been put online in 1993 – at Stanford, or more precisely, the cradle of Google. The SPIRES Project (for Stanford Public Information Retrieval System) was born in 1974 out of the series of bibliographical notes about articles on high-energy physics established by the library of Stanford University. Because its domain of analysis is limited and well defined, SPIRES is an exhaustive, publicly accessible, and free database, making complex searches possible on the body of citations. It is likely that Brin and Page were able to study and emulate this methodology when developing their own PageRank[TM] system. But besides this algorithm itself, there are more adaptive features that have contributed to make Google a true 'global mediator' of the World Wide Web.

CHAPTER 5. BONUS MATERIAL: OTHER FUNKY FUNCTIONALITIES

5.1 Filtered Algorithms: Ready-Made Data Banks and Control of the Users

Filtered algorithms are the way WWW works: as was mentioned earlier, the so-called filter bubble was in place many years before the general public got to know it. Graph Theory is the mathematical basis of all network algorithms, PageRank[TM] among them. This branch of mathematics studies methods to create, manage, and navigate different classes of networks, and to describe them with graphs, and rank them according to their size. The introduction of electronic calculators saw Graph Theory take a huge flight from the mid 50s of the previous century. In terms of geometry, one can figure a graph as a collection of points in space and continuous curves connecting pairs of points without crossing. In Graph Theory, a graph (not to be confused with a graphic) is a figure made up of points, called vertices or nodes, and of the lines connecting them, called arcs, edges or arrows.[30]

A network is a particular type of graph, in which it is possible to assign a different value, or weight, to separate arcs. This allows for the establishing of different values for different routes between nodes. The Internet is a graph, and the same can be said of all web pages when taken together. Google's search system is also based on this principle.

One of the most fundamental aspects of network algorithms is the relationship between the time factor and the number of examined nodes. The 'travel time' of a search, for instance (the time it takes to connect one node to another), is dependent on the number of elements in the network, and is always set between a minimum and a maximum value. This value can vary widely depending on the type of route the algorithm used.

In the network of web pages, every page is a node in the graph, and every link is an arc. Taking the time factor as starting point, it becomes obvious that search returns generated by Google as answer to a question (technically the returns of a query on its data bases) can impossibly be based on an examination of the 'entire' Internet.

Google's spider is constantly busy copying the Internet into its database: not an easy task. However, it is difficult to believe that the search engine browses through its complete database every time in order to retrieve the most important results. The key factor enabling Google to return almost immediate results is dependent on hidden sequences narrowing the general selection of data, which concretely means that it is dependent on the application of specific filtering devices.

30. A more technical definition: a graph is an ordered pair G = (V, E) comprising a set V of vertices or nodes together with a set E of edges or lines, which are 2-element subsets of V.

Starting from the query itself, the filter makes sure the final result is promptly arrived at by way of successive side steps and choices which have been developed with the explicit aim to limit the range of the blocks of data that are likely to be analyzed for that particular query.

This is how Google can return results for queries in an astonishingly short time. However, this makes the search process just as opaque as it is fast, or with other words, the search shows no coherence with the body of data that exists on that indexed part of network. Results for a search will be returned very quickly not only thanks to the massive computing power available, but also, and more importantly, because filters are there to limit the extent to which the data pool will be searched.

The filter's difficult task is to make a drastic selection of the network nodes to be looked at in order to exclude some and valorize others and their associated linkages. This method aims to exclude or include whole blocks of data amidst those that would generate results.

All this is made possible by the existence of preset, ready to use search databases, returning standard answers to standard questions, but also tweaking the returns through individual user's profiling. We can verify the existence of presets by looking at Google Suggestions: the machine suggests others search results from other human users', or bots', queries. The user's profile is made up from her search history, language, geographic position (IP address, GPS data), and app's data. Google Analytics is a good demonstration of Google's tracking power. Apps services are crucial to users' lives, so their status is tracked and showed to users in the Apps Status Dashboard: from Calendar to Gtalk, from Documents to Drive, from Sites to API. However, users don't use services in the same way: if a user habitually conducts searches in French for instance, not the whole of Google's database will be queried, but only the part that is written in French , which will obviously save a lot of time in the process.

Given the humongous amount of data, it is simply unthinkable to use transparent algorithms, meaning ones that will hit all the network's nodes. It is therefore unavoidable that some manipulations, simplifications, and deliberate limitations in the number of possible analyses are taking place. This happens for both technical reasons of computability in the strict sense, as well as for evident economic reasons. And one can, without falling into unjustified vilification, easily conceive that within a system already biased by approximations caused by filtering, further filters could be added to add, or maneuver into a better position of visibility, those returns that are linked with paid advertisements, or those which carry some doctrinal message.

However, seen from Google's point of view, it must be noted that filters are not directly linked to an economic motive, since they are not meant to sell something. They are linked to the habits of the user, and his personal interests. Google sells ads, not products (or if so, in a very limited way only, e.g. Google Mini hardware, new Google Glasses, or indexation systems for companies and organizations). Google's prime consideration is therefore to obtain data generating parameters that can be used to target advertisement campaigns accurately. The personalization of results is made possible by the information Google furnishes and gathers in the most discreet way possible.

E-mail, blogs, calendar, documents, video (YouTube), 'cloud computing' like GDrive (or 'virtual hard disks') and other services come to function as databases in such a way that they are far more suitable to profile users with than the users themselves could ever fathom.

Hence, the services Google offers in addition to search are very useful to the firm for experimenting new avenues of business with, but also, and foremost, because they play a key role as 'aggregators' of personal information' about users. A prime example is the electronic mail service GMail, a virtual hard disk of sorts (adding gigabytes of storage space every year), which is made available through a distribution system based on PageRank[TM]. Put simply, each (user) node of the Google network has a certain weight (allowed number of invitations to join) and can use it to offer the service (via a link) to her acquaintances. This method enables control over the usage made of the service, and at the same time the user discloses to Google key intelligence about his network of friends and acquaintances.

In a second stage, when new services are (beta-) released, this mechanism spreads out among invited individuals, who may send out new invitations. In doing so, a graph of human relationships between the users will be created, representing an enormous strategic value with respect to 'personalized' ad targeting.

If one considers all the information that can be gathered from e-mail traffic (to whom, why, in which language, which formats, which key words, which attachments) one can surmise the existence, in the Google data vaults, of not only a partial – but significant – double of the Internet, but also, of a copy, equally partial, and equally significant, of the relationships, personal, professional, and affective, of the service's users. This holds even more ground for the Google Account: by logging in you gain access to a series of overlapping services, of which all the algorithms are increasingly learning from your apps usage to serve you better. They do all the work.

In theory, filters merely serve to make the query process faster and to conform more to individual requests. Technically speaking, they are even necessary. Their usage, however, shows how easy it is, for a party with a dominant position over such services, to profit in a commercial sense from the data it has at its disposal, without giving much consideration to the privacy of its users.

To summarize: to this day, Google's database is able, based on what it knows about this or that user, and with the help of a few keywords, to return a query in such a manner that it is completely adjusted to the type of user. Far from being 'objective', search returns are preset and fine-tuned. Using the search function, enables Google to 'recognize' an individual better and better, and so to present her with 'appropriate' results.

The use of each Google service goes together with the acceptance of a whole set of rules and liability disclaimers by the users. Google, from its side, promises it will not reveal personal information to third parties. Yet, it is easy to presume that Google is able to exploit and commercialize users' data to its own ends. And then we need not even to consider the possibility (or rather: the certainty) that all sorts of intelligence and police services can access this information for any reason of 'national

security' they may like to invoke. What will most likely be the outcome is the addition of more search filters and the mash ups with others Webs giants' services and platforms like Facebook, Apple and Amazon in order to further personalize results.

5.2 Google's Cookies: Stuff That Leaves Traces

Users' profiles are always based on a system of search and selection. Profiling is a constantly expanding set of procedures; it includes concepts such as Clickstream analysis and CRM (Customer relationship management). It is interesting to note that consumer-profiling techniques derive from police investigative techniques, namely, the criminal-offender profiling techniques. Two types of profiling are prevalent on the Internet, one is straightforward, and the other is by implication. Explicit profiling necessitates registration whereby the user fills in a form, disclosing personal details. This information is archived in a database, and to be analyzed with the help of a string of parameters partitioning registered users into homogeneous groups (according to age, sex, occupation, interests). Conversely, implicit profiling is arrived at by tracking anonymous users during their visit to a site, through their IP address, or through cookies.

Cookies are little text files used by websites to leave some data behind in the user's computer. Every time the user comes back to that site, the browser resends the data stocked in the cookie. The aim is to automatize login authentication, to refresh eventual running operations, but mostly to 'reunite' the user with data from her previous visits.

Most Internet sites offering online services use cookies, and Google is surely no exception. The combination of cookies and filters on an algorithm allows for tracking an individual's navigation, and hence to accumulate information on his 'fingerprint'.

Let's take an example: Individual 'X' has a mobile phone number on her name, and uses her mobile to call her family, friends and a few work colleagues. After some time, she decides to do away with this phone and takes another one, not in her name, for the sake of privacy. Now, with this phone, she reconstructs her circle of acquaintances by contacting family, friends, and colleagues at work. This sequence of 'social links' (family, friends, colleagues) is, within the totality of all the world's phone calls, a unique one, which cannot be dissociated from the individual in question. So, even if we're not personally present with accounts on social networks platforms, it is not impossible to formalize such a sequence as graph representing the nodes and the arcs of a network. The values of which (the respective 'weight' of the links between different nodes) could be determined by assigning 'affinity value' to 'proximity', starting from the departure point of the analysis, in our case individual 'X'.

Getting rid of cookies is an excellent privacy protection practice. However, what applies to the mobile phone usage in the preceding example also applies to search behavior that can be tracked by cookies: just by looking at some specific search themes, it becomes possible to identity groups, or even single individuals, according to the 'fingerprints' they leave behind on the Web.

The unique trace which identifies our movements, our social contacts, our telephone calls, is just as unique as our preferences, our tastes, our idiosyncrasies, and our passions, which make each one of us different. Passions in this case would be, the sites we visit, and for Google more specifically the searches we are launching during our navigation. This mass of information we are giving to a search engine makes the compiling of our 'fingerprint' possible.

Profiling is the key to success in the Performance Society: an opaque practice misunderstood by millions of people who unwittingly tolerate it. In exchange for the private information they provide, users can use the techniques and the platform of the mediator. The techno-social system is a co-evolution, and pushes the performance. If you want to be part of it, you need to clearly spell out what you want, be proactive in the profiling of yourself and others, and you have to adapt to the Radical Transparency Ideology, since identity is constructed within relationships. Algorithms will take care of your needs. In the process, notions such as privacy and public sphere are radically transformed, while one's emotions need to be expressed on stage (emotional pornography). We have gone from personal to group footprint. We need to rethink social practices.

Profiling is generally accepted as an inevitable, indeed, desirable fact (sentiment analysis, narrow-casting, personal health records). Even many hackers and technology enthusiasts, who have a heightened awareness of the tools, often argue that there is no problem: the user knows she is being profiled, knows that even structural changes in the instrument are decided without her knowledge (default power) and that she can only choose to reject a feature already modified (opt out). The online democratic process is often limited to requesting the legitimate authority to censor online hate speech urging it remove all content that is deemed offensive.

These and other issues are further addressed in Ippolita's In the Facebook Aquarium. The Resistible Rise of Anarcho-Capitalism (forthcoming). It is worth noting that this Radical Transparency addiction starts from cookies. Like all cookies, the ones on the Internet have a 'sell-by' date. Internet sites sending cookies to our browsers must give a date by which the browser is allowed to delete the information contained in the cookie. However, smart use of cookies is not something that is often encountered: the fact that Google was able to exploit to its own advantage a technical trick with POSIX developers is interesting in this regard. (POSIX is the international standard that permits interoperability between Unix and Unix-like OSs, such as GNU/Linux). The expiration date for Google cookies is somewhere in 2038 – more or less the maximum possible. This means that for all practical purposes, the browser in our respective OSs will 'never' delete these cookies and the information contained therein.

5.3 Techno-Masturbation: Create! Search! Consume!... Your Own Content!

It is next to impossible to follow the rapid evolutions Google is going through on permanent basis. New services are launched in a quasi-convulsive way, and it is difficult to understand which ones are actually meant to have an impact on our lives, and which ones are likely to be discarded in the next few months or even weeks. And in general, it does not make very much sense, to lose oneself in complicated descriptions and exhaustive classifications that would inevitably contain errors and omissions, if you consider the mad rate of innovation and information 'burn' on the

Internet. The natural dynamics and fluidity of the networks should dissuade from any attempt at attaining complete knowledge – in case someone would be tempted to do so. One would get lost before even having started on such an ill-advised endeavor.

That being said, one can, albeit from a subjective and fragmentary viewpoint, try to formulate a general critique of Google, without going into technical details and without engaging in uncertain forecasts. As far as personalization is concerned, the increasing prevalence of the concept of 'prosumer', productor-consumer, is probably the most worthy of consideration.

Google is well known for its propensity to launch 'beta' versions of its services, when these are still provisional and under testing mode. This is a dynamic, as we have seen in the previous chapter, which is directly inspired from the modus operandi of the Free Software development communities. Users contribute significantly to the development of the new service through their feedback, impressions, and suggestions regarding its usability; they are at the same time users and producers of the service – 'prosumers' being the name given to this hybrid breed. In its aim to become the position of global mediator of web contents, Google sells technology and search results (through advertisements) to users, who are increasingly becoming both the creators as well as consumers of net content through the services of Google, which, in turn, are becoming more and more personalized.

One example, which would seem, de prime abord, to have very little to do with the others, should make the point regarding this closed content production and consumption cycle: Google Web Toolkit (GWT). In May 2006, Google launched 'Google Web Toolkit', a 'framework' that enables programmers to develop Ajax applications written in Java script. Ajax (or Asynchronous JavaScript and XML) is a technique for the development of dynamic, interactive web applications using standard HTML (or XHTML) together with CSS for the visual part, and with JavaScript for the dynamic display of and interaction between data. What you then get are extremely fast moving sites, since it is no longer necessary to download all information from the page 'afresh' every time. GMail uses Ajax for instance. This is an important innovation which transforms the approach to creating web applications, as it is written in a language with high-level objects (Java), which are then paired to GWT and networks that are compatible with all browsers.

However, on the other hand, there is no justification for a high-pitched announcement to the effect that an imaginary 'Web 2.0' has now come out, revolutionizing the Internet by making it 'machine readable'. After all, multiple platform software creation for bookmark sharing, social networking, automatic data aggregation techniques, etc. have been there for years. And the hypocrisy of large corporations like Sun, hyping up an alleged entry into the 'Participation Age', occults the fact that the aptitude for co-operation for decades had been the hallmark of hacker culture. And so, the most elementary parts of the innovations that had been advanced by organizations such as the W3C for the Semantic Web (like XML/RDF standardization) are being peddled as revolutionary developments!

Of course, Ajax and affiliated technologies do solve the very recurrent problem of portability of websites, which for the time being are difficult to visualize on all browsers. The framework code is available under a Apache license, and is thus Open Source, but – as often happens with initiatives coming out of code.google.com – a number of essential elements (in this case the Java-to-JavaScript compiler and the 'hosted web browser') are distributed in binaries only, and one has to subscribe to an ad hoc license, which to all practical purposes prevents redistribution, further development of derivatives, and its inclusion in commercial products. Furthermore, every time one uses the 'hosted web browser' permitting one to try applications out on one's machine before launching them on the Internet, a connection is established with a Google server, officially in order to verify that the latest version of the program is being used. It is, however, obvious that this constitutes more to a very efficient way of controlling developers rather than that it serves the interests of users. Of course, the code they develop may, on the other hand, be freely distributed, even in commercial products.

GWT in effect, is a very simple way to create sites that are perfectly compatible with Google's indexation systems. GTW is a free Swiss-knife for developers: above all, free in the sense that they don't get paid to work for Google! And developers are increasing number: for the time being, knowledge of a specific programming language like Java is mandatory, however, one can easily fathom the moment that new developments will enable a first time user to put web objects like task bars or image galleries, menus of all kinds and whatever what else on her page, without having to write or to know how to write a single line of code. And indeed, there are already extremely simple programs for websites creation (e.g. WYSYWIG – What You See Is What You Get), but GWT operates directly on the Web. Such contents are thus immediately usable on static or mobile platforms of whichever type, provided these are able to access the Web.

In 2006 we imagined Google signing up commercial agreements for the manufacturing of bespoken devices, by proposing to those who make use of its services simple, PC, smartphones, tablets, e-readers, 'visualizable' webpage making instruments. This, of course, makes it very simple for the information that the users of these devices provide to be indexed by Google's spider. Android and Chrome (both browser and OS) have been the outcomes. These agreements have been set up, because, contrary to Microsoft, Google does not offer programs for money, and it thus needs, as we have noted earlier, to spread its standards around in order to manage profitably its economy of search. And there is also a definite outlook for an agreement on video distribution: video.google.com and YouTube, are a warehouse of 'tapes', and television on mobile phones will definitely be the next stage in product evolution.

To put it differently: Google provides the instruments to create contents with according to its own standards. In the domain of content creation for the Web we see extreme personalization, which corresponds to the 'long tail' mechanism (which means providing each individual consumer with precisely the product demanded): the user creates 'exactly' what she wants - in Google's standard format. The complete decentralization at the level of content creation parallels complete decentralization of the advertisements, and hence the delivery of 'personalised' products.

What we are seeing is an invasive system imposing its own standards under the formal appearance of 'being democratic', since these standards are allegedly put into the hands of the users, and they are only one click on the browser away. What is being proposed as electronic democracy morphs into far-reaching standardization, which makes it possible to absorb the contents created by myriads of users, and in return to target the most appropriate advertisement at them.

5.4 Privacy, Paranoia, Power

The accumulation strategy pursued by Google has now enabled it to put the giant Microsoft in a difficult position, which forebodes a merciless war of standardization and of control over the access to the Web and to all other networks we use everyday. From the moment that the Google phenomenon addresses the global mediation of information, it concerns all the users of digital data, that is, us all. Going through Google's history thus means to look at our own past as explorers of both the Internet and the Web. Too often have we outsourced the management of our information, of our sites, of our picture galleries, of our blogs, of our SMSs, of our phone conversations, and friends, to companies that are everything but free from ulterior motives.

The 'strategy of objectivity' pursued by Google emphasizes scientific research, academic excellence, technological superiority, and sophisticated inter-faces. However, this is merely a veil occulting the frightening prospect of a single access point to all data generated by naive users.

The F/OSS strategy then, allows Google to adopt the collaborative methods of development typical of digital communities – adapting it to its own 'mission' in the process. But even in this case, as we have seen earlier, Google makes preposterous claims by proposing so-called 'new' methods to exploit well known dynamics (the 'Summer of Code' being a prime example).

Google's activities, therefore, constitute a clear and present danger to all of those who think that privacy, or, at a higher level, the whole issue of due diligence in the matter of 'being digital', is of primary importance. We are witnessing the emergence of a power conglomerate that is gaining, even as we speak today, far too much influence in the life of far too many people. Google is the holder of confidential information that it analyses all the time in order to achieve a steadily more personalized distribution of the plague that are advertisements. And since the accumulation of powers usually leads to the syndrome of domination, it becomes urgent to look in depth at this phenomenon.

There is no such thing as a global answer to resolve once and for all the issue of privacy. Big Brother does not exist, and like all paranoia, the fear his image induces blots out possible escape routes: it only serves the dominant power that thrives by it.

Secrecy, cryptography, and steganography are all examples of useful practices, but they are not definitive solutions. Communication and sharing both remain the objects of a desire, which can only be brought about by 'publication', i.e. by making public. However, putting personal stuff on private servers like on those of Google means 'to publish', not 'to make public'. Conversely, obsession with secrecy rapidly leads to paranoia and complot theory. Viewing it in this light, we

can ask what the purpose is of constructing complicated alternatives to arrive at absolutely secure and sheer impenetrable networks. Technology offers the opportunity for openness and sharing. To make use of machines means to make use of hybrid creatures, of material artifacts (which in this sense belong to the world of 'nature') that have been invested with cultural meanings and values (something that pertains to the domain of 'culture').

Networks are the outcome of a co-evolutive dynamic of mechanical, biological, and signifying machines: technology is essentially a mongrel. To create networks mean to connect machines of different types. It means creating methods of sharing, of exchange, of translation: one cannot withdraw in one's shell. It becomes necessary to engage in self-questioning and change.

We need informed research and analysis; it has become more urgent than ever to denounce the mechanisms of technological domination. Conversely, to renounce critical thinking and a critical attitude amounts to the same as giving in to the syndrome of control, and this is becoming increasingly invasive. Google's history can be used in an exemplary manner to sketch out and promote the ideas of openness and to imagine practices that aim towards the autonomous self-management of technologies. Google is so exemplary, because it represents the meeting point between the meritocratic habitus of Academia, the desire for boundless and unfettered innovation, and the edgiest form of financial capitalism.

Here, then, rises the occasion for the development of autonomous and decentralized networks, and the opportunity to confront the desire to 'explore' and to 'navigate' the Internet, to the necessity of 'accessing' the data. This occasion must be used to focus attention on the trajectory, rather than on the result.

CHAPTER 6. QUALITY, QUANTITY, RELATION

6.1 The Rise of Information

The information society is heterogeneous in the extreme: it uses network communication systems like telephony, digitalized versions of broadcast[31], pre-Web traditional media, like dailies, radio or television, and Internet-born ones like email or P2P exchange platforms; all of these communication systems are used with gay abandon, and usually without an afterthought. However, taking a closer look reveals that all these systems are based on one single resource: information. Now within the specific domain of search engines, and thus of information retrieval, one can state that what information consists of is represented by the total sum of all existent web pages.[32]

The quantitative and qualitative growth of all these pages and of their content has been inordinate and continues to be so. This has resulted from the fact that it has become so unbelievably easy today to put up content on the Web. However, contents are not isolated islands; they take shape within a multiplicity of relationships and links that bind together web pages, websites, issues, documents, and finally the contents themselves.

Direct and unmediated access to this mass of information is well nigh impossible, even as a simple play of thought: it would be like 'browsing through the web manually'. This is exactly the reason why there are search engines in the first place: to filters the Web's complexity and to serve as interface between the information and ourselves, by giving us search results we are happy with.

In the preceding chapters, we have reviewed the principal working tools of a search engine, that is, the instruments Google, and other search companies, have put in place to scan through web pages, to analyze and to order them with the help of ranking algorithms, to archive them on appropriate hardware supports, and finally, to return a result to the users based on their search queries.

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31. A broadcasting system unidirectionally transmits information to a plurality receiving systems. In a computer network a broadcast transmission sends information to all connected computers; other systems include unicast (a single receiver), multicast (many receivers), anycast (any receiver of a particular network, i.e., a one-to-one-of-many association). P2p systems just like phone systems are the exact opposite of broadcast systems, because they allow a many-to-many type of communication.
32. This is not the place for an in-depth discussion of the 'information' concept, and we have simplified the definition on purpose. For example it does not take into account the fact that search engines like Google also index other types of non-web contents, like Usenet messages archives or the contents of computers that that use Google Desktop; yet, since the great mass of information is mediated by a Web interface, and for example users often use Gmail instead of mail clients, we believe that such definition is acceptable.

The quantity of stored web pages is thus crucial to estimate the technical and economic potency of a search engine. The larger its 'capital' of checkable web pages, the higher a search engine will score on trustworthiness and completeness of its returns, although this is obviously bound to the limits of the specified context.

Yet, however enormous a search engine's 'pages capital' may be, it will, and could, never be entirely complete and exhaustive, and no amount of time, money or technology invested in it could change that. It is absurd to think that it would be possible to know, or, at a more down-to-earth level, simply to copy and catalog all of the Internet. It is even more absurd when taking into account the rise of social networking platforms. It would be a (false) pretense to know the totality of the living world, including its constant mutations.

The information storage devices used by search engines like Google are like vessels: let's imagine we'd have to fill an enormous vessel with diminutive droplets (think of all the pages that constitute the Web's information). Assuming that our vessel is able to contain them all, our task would then be to capture and identify them all, one by one, in a systematic and repetitive manner.

However if, on the other hand, we'd think there are more droplets then our vessel can contain, or that we cannot fathom an algorithm to capture them all, or that the capture may be possible but will be slow, or even that the whole task maybe hopelessly... endless, then we would need to switch our tactics. Especially when our data-droplets change with time, when pages get modified, and when resources are jumping from one address to another...

At this stage, we might decide to go only for the larger droplets, or to concentrate our efforts on those places where most droplets fall, or we could choose to collect only those droplets that interest us most, and then try to link them together in the way we think is the most relevant.

While search engines companies continue to go after the holy grail of cataloging 'everything' on the Net, it would actually be better to take a more localized approach to the Web, or to accept that for any given 'search intention', there may well be many answers possible, and that among all these answers some may be 'better', because they conform to specific demands regarding [either?] speed [or?] and completeness. One should always keep in mind that the quality of results is dependent upon our subjective perception when it comes to being satisfied with a search return. Of course, if subjective perception is biased by emotional pornography on the social web stages, it is a very standardized and poor perception. Developing a taste for good information is as difficult as developing a taste for quality food.

Moreover, in order to accept or to reject a search return, it is essential to apply our critical faculties and to be conscious of the subjectivity of one's viewpoint. In order to establish the trajectory one is really interested in, it is necessary to assume the existence of a closed and delimited network, a kind of world that is bounded only by our own personal requirements, yet always realizing that this concerns a subjective localization, which is neither absolute nor constant in time. We change; our tastes and identities are changing.

From an analytical point of view, charting a network means being able to partition the network for examination into sub-networks, which amounts to creating little localized and temporary worlds (LCWs Localized Closed Worlds) that each contain at least one answer to the search that has been started. If this were not the case, many searches would go on with no end in sight, especially since the amount of data to be analyzed goes well beyond the ability of a human person to capture it all: hence this would be a non-starter. Conversely, altering and specifying the query, and refining one's vantage point, will generate a trajectory that is more concordant with the departure point of the search. By looking at the Web as a closed and localized world we also accept that the very dynamic of birth, growth and networked distribution of information (even happening while this information may already have become invalid) is an 'emergence' phenomenon, which is neither fortuitous, nor without a cause.

Emergence[33] is an occurrence that can be described in mathematical terms as an unexpected outburst of complexity. However, it is foremost an event that generates situations which cannot be exhaustively described. To analyze and navigate an 'emerging universe' like the Web demands a permanent repositioning of oneself. This not only provides the 'closed and localized world' with abilities and expectations, but it also opens it up towards new avenues of exploration (other worlds are always possible, outside one's own closed one), and thus the appreciation that results can only and ever be fragmented and incomplete.

6.2 Quantity and Quality

Indexation by way of accumulating pages is a quantitative phenomenon, but it does not in itself determine the quality of information on the Web; the prime objective of such an indexation is to capture all pages, and not to make a selection. The relationships between the pages give rise to emergence because they are generated on basis of a simple criterion, namely, links that exist between them. The quality of information, hence, springs forth from their typology, and is determined by their ability to trace trajectories; it isn't bothered by the need to capture 'all' information available. Quality, therefore, comes to depend mostly on making a vantage point explicit through a particular search trajectory: basically, it are the surfers, the pirates, the users of the web who determine, but also increase the quality of information by establishing links between pages. The power of accumulation of Google's algorithms is a useful asset in achieving this, but is insufficient on its own.

The evaluation of the pages' content has been outsourced to algorithms, or rather to the companies controlling them. The whole Google phenomenon is based on our habit to trust an entity with a seemingly unlimited power, and which is able to offer us the opportunity to find 'something' interesting and useful from within its own resource 'capital', which itself is being put forward as 'the whole Web'. However, the limits of this allegedly miraculous offer are being occulted: there

33. The principle of emergence describes the behavior of complex systems. It can be defined as the process of formation and emergence of complex behaviors or patterns out of a set of simple rules. Cognitive sciences use the concept to describe the 'explosion' of complexity typical of human intelligence: thoughts and consciousness are generated by relatively simple unconscious elements such as neurons.

has been no word about what was not in that 'capital', or only in part, and especially not about what has been excised from it.

The thorny ethical and political problem that is linked to the management and control of information still refuses to go away: who is there to guarantee the trustworthiness of an enterprise whose prime motive is profit, however 'good' it may be?

Even though a considerable amount of economic resources and an outstanding technological infrastructure are put to the task of constantly improving the storage and retrieval of data, the political question that arises from the accumulation of data by one single actor cannot and should not be sidestepped. Google represents an unheard of concentration of private data; a source of immense power, which is yet devoid of any transparency. It is obvious that no privacy law can address and remedy this situation, and that it would be even less the case through the creation of ad hoc national or international instances towards the control of personal and sensitive data.

The answer to the issue with the confidentiality of data can only reside within a larger awareness and in having the individuals who create the Web as it is take their responsibility. This should be achieved through a process of self-information. Even if this is no easy road to be travelled, it is the only one that is likely to be worth pursuing in the end.

6.3 The Myth of Instantaneous Search

Since it is clear that Google's data 'capital', Big Data gigantic as it is, will never correspond to the totality of the information present on the Web, presenting oneself as an 'instantaneous' interface, bridging the gap between the users search intentions and the so-called 'exact' result hints of naivety – or of deceit.

The Myth of instantaneous search is nurtured by the work of filtered algorithms. Since the Web consists of nodes (pages) and arcs (links), every time one browses it by visiting pages, one will follow its links and thereby create a trajectory that is analyzable through the mathematical models of the graph theory.

The preset orientations search engines provide us with will always lead us to the 'right' object, no matter what dimensions of the Web are, or will be in the future. By making use of efficiency and efficaciousness criteria, a search engine will distract from the query the 'optimized' trajectory, which means that the number of nodes hit during the search will be low, and hence the total amount of time the search takes will look nearly instantaneous.

Google actually pushes its users in the direction of one single trajectory, which is illustrated by the 'I'm feeling lucky' button on the main page. This 'optimization' squeezes search into a three pronged sequential scheme: 'user-algorithm-goal'. On the long term, this dynamic will lead to 'digital passivity'; a stage in which we will simply wait till results are brought to us by search engines, so we only have to choose from a limited set of results.

Moreover, this efficiency/ efficaciousness is, paradoxically, not based on an increase in the size of the data pool in which searches are conducted, but on its opposite, on a limitation of the access to the information 'capital'. This can be explained by the fact that no trajectory proposed by the search engine will ever take place in real time (in French 'le moment "t"') on the network; it will always be calculated according to what has actually been archived, and to the user profile that has been obtained through filters and cookies.

The speed with which access to information is being offered by Google is fast, very fast, and it even looks immediate, to the point of suggesting the annihilation of time, and it implies the existence of an immensity of data that have been perused for the purpose. The mediation of technology (through interfaces, algorithms, pre-set searches and suggestions) is what makes possible both this temporal 'annihilation' as well as the feeling of practically being given immediate access. The feeling of satisfaction users experience as a result of this 'immediacy', however, is something else completely; it generates addiction, and compulsion in the using of tools by clicking and touching it again and again, and it also creates the desire to extend this immediacy into every field of life.

The rapidity with which results are returned, however, has a detrimental effect on the quality of the search. As everyone who has conducted (re)search herself knows: the time one spends on (re)searching is a determinant element of the experience. You have to map out your own research path, and make choices according to the moment; all of these activities generate a feeling of being into it and this feeling is deeply satisfying. Google allows us to 'localize' in space (that is, its own multidimensional space) what it is that we want, but, however brief the time spent on waiting for the result, we always adopt a passive attitude in front of the technological oracle.

In an active (re)search process though, the aim is no longer to gain 'access' to the data, but to accomplish a rich and variegated journey, and to use the (re)search endeavor for mapping out complex trajectories. Efficiency as a concept vanishes. The larger the number of visited nodes, the greater the complexity of the inter-linkages we conceive, and the more numerous the occasions that trigger significant choices and refines our (re)search will be. This approach allows for a cognitive enrichment that goes well beyond the immediate performance. For instance, each time we visit links offered to us by a site we are visiting, and then continue our navigation on sites that have been marked as congenial, we create a unique trajectory; maybe we'll even resort to bookmarking them. Such a procedure is starkly at variance with a coherent user-algorithm-result sequence, but it does create a rich path full of sidelines, of branches, of cognitive jumps and winding detours, all catering to a non-linear cognitive desire, an autopoietic desire to better feed organisms.

To conclude, search engines are perfect tools for fulfilling the quantitative aspects of a (re)search taking place within an already fully structured resource pool, such as are lexicons, cyclopedias, etc. Here, the quantity is directly in proportion to the accumulation and computing potential: Google's reach obviously dwarfs that of all of its competitors, but in order to retain its position, Google needs to constantly expand in terms of algorithms, machines, users, etc. Conversely, quality needs not necessarily reside with technological prowess or economic might. Nobody in her right mind

believes that the results returned correspond to the full spectrum of available information: the emergence of the best possible path cannot be foreseen, cannot be computed, but can only be arrived at step by step.

6.4 Under the Veil of the Myth

The positioning values of Google's ranking do not correspond to any clear evaluation criterion: yet, in the majority of cases the results returned are [look?] exhaustive, that is, we can in no way tell whether something has escaped the spider, unless one is an expert in the issue at stake and knows a resource that has not been indexed by Google. The capillary distribution of its search tools has made Google a 'de facto' standard.

The white space ('blank box') where we type the keywords of our (re)search functions for the user as 'Weltanschauung' of sorts, promoting a very particular worldview, namely, of the idea of 'total service': the search engine will answer any question, and will satisfy all requests made in the realm of the Internet.

Epistemologically speaking, the 'blank box' represents a cognitive model of the organization of knowledge: We request through the white space an answer to all the search intentions we have put forward; it is indifferent to whether we wanted documents, or further information, or data, or that we simply wanted to 'navigate'. The (re)search activity becomes completely merged with the entity that provides the service, Google.

The habit of using this tool becomes ingrained behavior, a repetitive activity, an addiction, and finally a set of unconscious rituals feeding online algorithms: it becomes very difficult for users to imagine a different way to satisfy their need for 'input'. They have become tied up to the reassuring efficiency/efficaciousness of the 'blank box'.

To be active on the Web, and thus needing to access interfaces and tools for unearthing information and setting out paths, is a profoundly contextual and diversified occupation. (Re) search is everything, but homogeneous, and it cannot be reduced to the use of the 'blank box'. What we request and what we desire does not solely stem from a desire that can be expressed in the analytical terms of quantitative information, but is something that also hinges upon the way we approach (re)search, the context in which we undertake that (re)search, our own cultural background and, last but not least, on our aptitude to confronting novelties, exploring new territories, or more generally speaking, to facing diversity.. It is impossible to satisfy the quest for information through a one size fits all solution.

Since the indexation of web pages is by definition only incomplete in the sense that it is a selection obtained through the ranking system, what Google does offer us is the prosaic possibility to 'encounter 'something' we might find interesting and/or useful in its overflowing amount of data]. A (re)search intention, however, implies a desire to find, or even to discover, 'everything what one doesn't know, but which is possible to learn about'. The 'good' giant then appears for what he is: enormous, extended, and branching out, but not necessarily adapted to our (re)search purposes.

6.5 (Re)search Models

The ambiguity entertained by search engines – wanting us to 'search in their infinite environment' rather than in a closed, localized world that conforms to our (re)search intentions – stems from the formal superimposition of two distinct levels, namely, that of the interface and that of the organization. The interface, in this particular context, is the technological element through which one accesses the information and through which the search gets executed; the organization, on the other hand, is the architecture, the technological model with which information is archived and disposed. The two levels obviously influence each other: organization-related choices prescribe the use of specific interfaces, while the information that is being visualized through these interfaces reveals the form in which it is archived.

The problem with this superimposition is that the information is presented in the form of identifiable and unambiguous, single data. The user of Google moves in a linear fashion through the list with ranked results; in order to move from one result to the next she needs to go back to the start list, and it is thus not possible to make crossover linkages at the level of the interface. With search engines, then, people merely retrieve information, and no consideration is being given to the path that has been followed to obtain it.

The interface which directs our interactions is the 'blank box' in which our queries are inserted: at this first level of access, all information are on the same plane, and at the same level. They are homogeneous, yet at the same time separate and fragmented in order to allow for a certain listing of the results, since they have been arranged in order of pertinence by the algorithm.

However, the results from the (re)searches one does on a daily basis, can actually be linked together in all sorts of ways. It is not necessary to have results being arranged in the same order every time, since it is often the case that there is no single correct answer. On the contrary, a (re) search that does not focus on obtaining data that is structured similar to how an encyclopedia or a dictionary is structured (and even those may change in nature over time), could just as well remain without an immediate answer; such results would require an effort of creativity, of 'mixage', and of recombination

When a formal identity is being imposed on the relation between the level of the interface and that of the organization, the outcome is, by necessity, a constraining model. In Google's case (since we are discussing what is perceived as an infinite power of search after all), the means to arrive at a result are being substituted for the (re)search activity itself. Let's take an example: Google the English word 'case'. The returns, of course, vary depending on your 'personal bubble' because of filters algorithms; however, it is interesting to note that the first returns (out of millions!) will be anything (various manufacturers, firms, companies from all over the world, but also educational institutions, associations, universities, food, a singer, etc.) but no 'boxes', 'examples', 'instances', 'lawsuits' or 'states of something'. The common meanings of a word so frequently used as 'case disappear in Google's ranking and this is not a mere matter of vocabulary: it shows how Google perceives and represents the world. Thanks to Google, you can surf the web; maybe you can also find what you were not looking for, by chance or serendipity. But research is mainly about 'making

connections where none previously existed', and so is learning: it means to dig, to conjecture, to imagine, to dive, and sometimes to get lost. Google is not so useful for these purposes, and indeed distracts.

A more extended perspective of what it means to 'discover' information, and that would mean taking into account, in a critical manner, the cognitive potential underlying every information resource pool, would tend to see the access-search function as a process of exploration and creation rather than as one of localization. The emphasis would then shift from epistemology towards ontology: it is no longer sufficient to only know the information, but one also has to become aware of our true role as creators of information. Exploring networks is tantamount to creating them: in this sense, we can draw from Maturana and Varela, who refer to this process as 'network autopoiesis', that networks are generated by our own practices. Search engines that operate on the access level are therefore of no use for exploration, since they merely intervene on the first and most basic level of the presentation of information.

Browsing is the moment of true dynamism in the linking together of digital objects, because it is through browsing that they are able to express to the highest degree their heuristic and communicative potential. This is something that is learned through experience, and it mutates as we are learning it by means of exploring.

There is a major difference between searching and finding. Google makes us 'find' things, which creates the satisfaction that goes hand in hand with the feeling of accumulation. However, what is far more interesting is that 'finding' is the search itself. And maybe it would be even more rewarding to 'find', but not completely, because that would mean that we would still be engaged in the act of (re)searching.

A search engine is an instrumental model that arranges information into a certain order. It would be more useful and also more commendable to imagine models that (re)combine information, and so generate knowledge.

CHAPTER 7. TECHNOCRACY, ALGOCRACY

Analysis of the Google phenomenon reveals a colorful landscape, in which the economy of search is but one element within a far larger and more complex mosaic. Even Eric Schmidt himself states that Mountain View is setting up the foundations for a global information technology enterprise, a 'One Hundred Billion Dollars Business', which will obviously be something more than a mere search engine firm.

What the Google phenomenon actually embodies is an invasive knowledge management system, whose most significant development and methods we have sketched in the previous chapters: strategies that pair aggressive marketing with smart image building, propagation of highly configurable and customizable, and yet always recognizable interfaces, creation of standard contents 'outsourced' to users and developers, adoption of development methods straight out the co-operative Free and Open Software handbook, use of state-of-the-art data capture and archival systems, information retrieval systems associated with advanced profiling techniques, both implicit and explicit, and last but not least, sophisticated personalization of advertisements.

Google is the technology of domination that becomes, exercised through its algorithms, an instrument of knowledge management, and the direct expression of technocracy.

7.1 Technocracy or the Experts of Science

Experts have found in the control and manipulation of technology the ideal tool to maintain their power, impose their personal interests upon society, or acquire more privileges with. The mechanism is absurdly simple: technology is being (re)presented not only as the guarantor of the objectivity in scientific research, it is also used to validate the decisions of politicians in power, or more generally, those of any 'authority' that has access to the technological oracle.

The application of scientific research in its technological form is excessive, yet reality is constantly being interpreted according to this particular paradigm. The curiosity and desire for knowledge that inspire scientific research are being hampered by the ill-informed profitability criteria that are the hallmark of contemporary private and public funding. If research does not come up with immediate profits generating technological artifacts, it is deemed uninteresting. The power's discourse, then, becomes technocratic; it is located completely at the opposite end of community-oriented sharing, self-management, dialogue and mediation between individuals. To sell Google's technocracy as if it were a tool for direct democracy is a charade that is meant to make us believe that we are participants in some sort of grand electronic democracy game, a narrative that actually is totally devoid of substance.

Sure, we may publish what we want on the Internet, and Google shall index us. But we, who are 'dilettantes' and 'heretics', are not allowed to mention that Google's accumulation strategy resonates remarkably well with the market economy system, which is based on endless growth. This makes sense, since we are neither alumni of the London School of Economics, nor successful entrepreneurs, or certified experts. Hence, we have no 'authority' whatsoever. Yet, common sense and Orwellian memories are more than enough to realize that such a growth, without end or aim, is the manifestation of the will of the technological powers that view human individuals only as potential consumers and nothing more.

That is why PageRank[TM], which as we have seen is not merely an algorithm, becomes the cultural prism through which Google intends us to analyze everything. In a certain sense, what we witness is an enforced extension from the peer review system – which might work all right within the academic system – to the whole gamut of human knowledge.

Traditional authorities, like religious or political institutions, have hit rock bottom as far as their credibility is concerned. Nonetheless, their loss of grip on reality, far from having favored the blossoming up of autonomous spaces, has led to an unreal situation in which no assertion can assumed to be true, unless it is validated by some sort of technological authority. The authority of machines, in most cases, is embodied by the search results that are returned to the wealthy class of 'prosumers', and that have been extracted from a database that was dished out by the high priest of technology, and subsequently assorted by experts. An extreme form of relativism is the hallmark of methods which pretend to extract 'the truth' from the available and allegedly boundless number of data, as one can surmise from the number of algorithms and filters that have been used to obtain this 'truth'. The true meaning of any 'appropriate answer' to a search query is actually: 'a personalized product to every consumer'.

Confronted with this closure of creation, and with the management and application of knowledge at our expense, there appear to remain only two options: the refusal of scientific culture as the root of all evil; or on the contrary, blind and enthusiastic acceptance of every 'innovation' brought forth by technology. However, between these two extremes, techno-hate or Luddites and techno-craze or enthusiasts, it should be possible to advance the curiosity which is associated with the hacker ethic, that is to say, the sharing of knowledge, the critical attitude towards 'truths', the rigorous verification of sources, while going for the way of open knowledge and free circulation of information.

Education, then, is a fundamental issue in this context; however, the means to disseminate scientific knowledge on a large scale are simply not there, and this is not fortuitous. Educational structures in Europe as well as in North America are only geared towards the production of specialists. As of today, no pedagogic model exists that would correspond to a demand for a 'dilettante' kind of scientific approach to knowledge, not even in countries with a non-western tradition like Brazil or India, which are nonetheless producing high level scientific research and state-of-the-art technology at low costs 'thanks' to unremitting international competition.

A scientific activity, neither academic nor entrepreneurial, but decentralized and of a 'DIY kind' is nowhere on the agenda, despite the fact that it is indispensable for fostering basic competences and the ability to evaluate the technological innovation that concerns all of us. More specifically, the whole notion of 'scientific culture' would need to be appraised afresh to cater for the all round need to have an elementary command of what is needed to confront the technological tsunami that engulfs us. The rise of Information technology to the status of main mover of technological innovation makes new scenarios possible: IT is not merely a technique to automatize the management of information, it also has logic of its own, meaning that it constantly strives to alter its own underpinnings. IT is all at once material, theoretical and experimental. IT adds to the formalization of language (and hence contributes to the formalization of knowledge), and puts that to work with the physical components of electronics, developing from there languages which in their turn influence theories of knowledge.

IT functions as a loop of sorts, following a very particular cyclical process. In classic sciences one observes stable phenomena: the science of physics, for instance, constructs natural data and creates relevant theories. However, with IT, and its derivate computer science, the phenomena that theory helps identify are wholly artificial; they continuously change, both in nature as well as conceptually, in the same time and measure as theoretical and experimental advances make them more refined: the software that was developed on a computer ten years ago will be structurally different from one that has been developed the last month. What we held for true yesterday, we know today won't hold true for tomorrow, when we will have more powerful machines that can do novel things. The world we live in is 'alive' as it were and hence in a constant state of becoming.

7.2 Miracles of Technology: From Subjective Opinions to Objective Truth

It is amidst such a gigantic database that the 'good giant' Google appears in the landscape with a message for us: we are part of a yet unheard of 'global electronic democracy'; the results of PageRank[TM] are correct since they emerge from a direct democracy, as expressed by the links validated by Google's algorithms, which re institute us, in a certain sense, in our rights to 'open it up'.

Epistemologically speaking, however, popularity can never be acknowledged as a test for 'objective quality'. If that were the case, then the concept of objectivity itself would be based on an unstated assumption, that is to say, a mass of subjective ideas (the 'opinions' expressed by way of links) would somehow, as if by magic, be transformed into their exact opposite (in this case, a 'revealed' objective truth) by the sheer virtue of its number passing the majority threshold. This is exactly how ranking becomes a token of quality, since it is the explicit outcome of a technology based on the manipulation of information.

However, how can quantity ever become quality? One assumes, without admitting so much explicitly, that the technical mediation of the algorithm is in itself a guarantee of 'objectivity', and one associates this objectivity with the qualitative characteristic of 'good', then of 'best', and finally, that of 'true'. And all this has to be rendered fast, nay, immediate, and transparent, thanks to the annihilation of the time factor and the ergonomic sophistication of the interface.

The 'consensus creation mechanism', which Google considers to be the manifestation of 'direct democracy' since it works via votes from users, does not convince for two main reasons: first, it presumes that the majority is always right, and secondly, it implies that the majority of opinions must necessarily go through a technological mediation to really benefit users. Yet, how that precisely works is never explained properly.

The dichotomy between what is objective and what is subjective, superimposed on the concepts of truth vs. opinions, is totally inappropriate in the world of networks. Science has always created nature-culture hybrids for the sake of exactitude, meaning that it has invented techniques and fostered technologies. On the one hand, observation and experiments take 'nature' as their field of endeavor, and it is in that sense that they can be considered 'objective'; on the other hand, the results obtained are highly subjective because science operates under the influence of individual will and political and social perception, since science is mediated through language (even though it is the language of scientific communication) and because science is also a source of power (up to and including the atomic bomb).

The technology that drives networks is the current application of the scientific method creating 'nature-culture hybrids', which amounts to umpteenth scientific objects presenting themselves as ever more viable tokens of reality, in lieu of human beings. For more on technology as a hybridizing 'bridge' between nature and culture, see the work of Bruno Latour. A similar approach is also found in the work of Gilbert Simondon on 'transindividual technology' a hybrid space both individual and collective. The technological hybrid that is PageRank[TM]'s verdict is henceforth more valid than anyone else's opinion, and Google's result carry more weight than the expert's view on the matter, even if it only were because PageRank[TM]'s advice is always one click away -unlike the expert's.

As we stated in the introduction, the Internet is a 'natural' phenomenon after all. It is a material object, made out of mechanical and electronic machines; and at the same time, it is a cultural phenomenon, because it would not exist without the meaning that culture has assigned to it, which is constituted by meaningful interaction between human actors, or, to be more precise between biological underling and electronic machines underling, and also between the both of them. The hybrid character of networks is the necessary consequence of the hybrid character of the technology itself.

Another possible viewpoint on the issue of subjectivity vs. objectivity is about the decision-making model: how to decide what is relevant? It is easy to assume, in a relativistic context, that an information is 'objective' when it comes from a site (or a blog, or from Google, or from an official source) if this value judgment itself is the outcome of clear assumptions, of a transparent process, and of a limited, localized viewpoint. A network based on trust, that is, a group of people who share information, opinions and knowledge in a general sense, readily discloses its working methods, its hierarchy if there is one, and the conditions it imposes to become member of its network or project. Every time one checks out the answers given by such a trust network, one can read these answers as 'objective' in the sense that they hold 'true' for and in that network, and relevant with regard to its experience. This objectivity and relevance are the outcome of many different subjectivities and

of a strong interaction between the members of that network. If one feels to be in agreement with that community, one could then consider the information relevant, or one could also dismiss it in favor of other trusted networks.

Following this approach, and if Google was to be prepared to disclose publicly its decision-making mechanism, and if Internet users were to be able to understand that much, then the objective vs. subjective issue could easily be set aside. One would not only be able to empathize step by step, search after search, with the network that would please us most, but he would also be able to directly influence it, by keeping it within our tastes and preferences, our ideas, and our idiosyncrasies - or in short: in accordance with who we are.

7.3 Public Sphere and Private Sphere

PageRank[TM] illustrates another dichotomy: the one between the public and the private sphere. In effect, everything that passes through Google is made public: who didn't find private e-mails amidst the ranking's returns, maybe because they were send by error to a public mailing list? Now that an ever increasing mass of personal information transits through Google - and IT carriers in general - the possibility of one's phone calls (channeled through VoIP for instance) being archived and made retrievable by way of a search engines no longer appears so distant. It could be argued that technology also manages to 'hybridize' the public and private sphere: and anyway, to connect to the Internet means to open up to the world, and once we have opened up, it is the world that opens itself up to our lives.

There are already networks that maintain practices, which destroy any illusion of objective information. They decide themselves, in a deliberate, precise, and totally subjective way, what they want to make public and what they wish to keep private. This phenomenon takes its full signification when a search engine turns out to be unable to honor a query of which the specified quality is greater than the qualitative availability and proposed technical infrastructure.

The best-known example is peer-to-peer network search (P2P),[34] which can be accessed with softwares like 'eMule' and torrent clients among others. The mass of data that can be searched in these networks corresponds to the data shared by the users it changes in an irregular fashion over time, and this is why such networks are described as 'transient'.[35] Transient, because a user is free to classify any material she puts in the system as either public or restricted to the private

34. P2P literally means 'peer-to-peer'. It is a mode o of communication whereby all parties have the same functionality and each can initiate the communication process. It is radically different from other models such as server/client or master/slave. P2p is often implemented by offering to each node both server and client capabilities. In other words, Peer-to-peer applications allow users to directly exchange files over the Internet. More specifically, p2p is a 'transient' network that allows a group of people using the same application to connect and gain direct access directly to shared resources.
35. The term 'transient' derives from astrophysics and from acoustics and refers to a source whose radiation varies over time in a random manner. 'Transient' networks are temporary from the point of view of their informational flows; in the case of p2p networks their 'transient' character depends on the variation of the amount of information each individual shares.

sphere. It is also a ground rule of P2P exchange that contents are to be offered and shared freely (at least those that are searchable within the network) in order to be able to receive other contents in return. In itself, P2P is a legitimate practice; however, data (audio, video, text files etc.) that are protected by copyright may be shared abusively, which means that at least one fourth of the population should go to jail for illegally downloading a MP3 file or such. Moreover, an individual choice between the public and private sphere appears to become more urgent by the day. A broad spectrum of possibilities is available, ranging from the moderate option of fostering information exchange, up to the radical option of simply avoiding any legal consideration, and going straight to the source of piracy in order to enjoy anything the Web has to offer.

This spread of piracy should, by no means, be taken as proof that we are on the verge of a popular revolution, especially since the sort of piracy at stake here is mostly a half (in)voluntary one, and certainly not the outcome of a reasoned choice by committed individuals to oppose the current knowledge protection system and face the consequences. It is more that digital technology has done away with the material constraints of reproducibility and that the consumer culture pushes us to desire without end. At least as far as information is concerned, we seem to find it perfectly natural to desire anything we care to imagine, even though it should be obvious that we will never be able to listen to but a fraction of the music we download from the Net, or to see a meaningful portion of the films we have stored on our hard drives. Yet, the existence of desire, which is limitless 'sui generis' when combined with technological opportunity, raises very serious questions regarding the distribution and equality of access to knowledge. The free and costless aspect characteristic of these exchanges defies the primacy of 'productivist economics'. The diffusion of opinions, for instance by blogs, throws the very format of traditional mass media into crisis.

Basically P2P is nothing more than the surface level and the most widespread manifestation of a form of exchange that is entirely independent from any authority that is by statute above the community level. There are many more instances of qualitative (re)search that are all taken care of by trust networks, which could redefine our orientation perspectives on the Internet. In certain cases, these subjective trajectories are centered around professional or cultural affinities, such as online forums, newsgroups, and specialized blogs; and in other cases, the binding element is their opposition to the official sources; one often encounters sufficiently structured examples to constitute an alternative model in terms of knowledge management.

It is therefore possible to imagine an – albeit slow – evolution of knowledge circuits from blogs towards P2P networks. An exchange of programs with no links to web publications, supported by dynamic networks, where it is possible to share information flows and data files between users, who would then truly constitute circles of friends. This would enable us to make the distinction between what is private and what is public, dynamic and fluid, instead of static and frozen: every individual would be free to share her information, combined with a flexible level of accessibility from public to private.

7.4 Escape Routes: Independent Media, Cryptography, Blogs, FoaF

After the explosion of the blogosphere, blogs – websites exposing the personal views of their authors, the links they chose, and the comments of their readers – are overcome by the microblogging phenomenon, from Netlog to Twitter. The mass of the blog, dead or dying of starvation without RSS feeds – the logic of Zero Comments[36] is fierce – was reconfigured. A few established BigBloggers are opinion leaders broadly followed, such diverse as Andrew Sullivan, Joani Sanchez or Beppe Grillo; on the other side, Big Corporate Blogs are more and more similar to tabloids, blurring the difference between news and gossip (e.g. The Huffington Post, The Verge, Gawker). Traditional newspapers - whose paper version seems to have its days numbered – contribute the general deterioration of quality of news by pushing their prominent journalists to open their personal blog under the umbrella of the main website.

Mathematically speaking, blogs behave according to Darwin's law, and they demonstrate the distribution characteristics of a 'long tail' market: a few hundred blogs amass a considerable amount of links (with 4,000 of them making out the blog's 'Who's Who'), while most of them – millions actually – have very few of them. In this sense, as we saw already in Chapter 2, blogs are part of the same economic set-up as (re)search. A blog enables one to share her declared, individual, and subjective viewpoint without any filter; the number of links to a blog is witness to its popularity and hence measure of its authority, which can equate or even surpass that of dailies and other traditional media as far as influence on public opinion is concerned. Credibility, trust and reputation are only related to the blog's importance: as a particular blog's popularity grows, it becomes difficult for it to go astray without being immediately strafed – which means not be linked anymore and thus to quickly vanish from memory.

The authority commanded by Beppe Grillo's blog, the only Italian blog amongst the world's 100 most popular blogs as expressed in the number of links, is greater than that of the blogs of La República or Corriere della Sera (the two major Italian daily papers). The personage Beppe Grillo writes in an idiosyncratic vein, and he does not claim to sell the truth: he simply tells what he deems important from his own point of view. In a certain sense, blogs create self-managed sharing spaces; sometimes they even become the sole sources of independent information amidst the 'normalized' mass media. This was, for instance, the case of Iraqi blogger Salam Pax (aka Salam al-Janabi) during the second Gulf War.

The greatest novelty that blogs brought to the spread of information is the automatic bundling together of different sources through RSS feed, which has become the de facto standard of exporting content on the Web. In short, RSS is an automated method to rapidly switch from one website to another, and to find and export contents that are of interest to us. The popularity of blogs is probably the main reason why RSS is so successful: thousands of weblogs are producing RSS contents, so that one sees a profusion of sites, called blogs aggregators, which offer a selection from the most-read blogs, and also of programs that enable one to access any blog

36. Geert Lovink, Zero Comments: Blogging and Critical Internet Culture, New York: Routledge, 2007.

directly on one's machine. This makes it possible to search for contents in the blogosphere without going through Google.

The fact that it has become possible to automatically receive on your computer the latest stuff that has been written on subjects that are of great interest to you is an innovation that is clearly bound to have enormous consequences for the way in which the Web is being used. Or to put it more generally, we see, here, the first step of a development with which it becomes possible to have any data at hand in a format that is easy to share, transform and expand. RSS makes information accessible on all digital supports indifferent of whether it is a site, a program installed on a machine, a mobile phone, or what ever kind of technological device.

There are, however, many other ways of seeking information. Whereas Google presents itself as a public and objective tool, Indymedia.org, for instance, profiles itself as a 'collectively run media outlets for the creation of radical, accurate, and passionate telling of the truth'. Hence the group of people that constitutes Indymedia acts in accordance with a very specific kind of publication policy: in the right hand column, the so-called newswire, everyone is free to publish. Nothing gets censored, although 'the posts that are clearly 'racist, sexist of fascist' will be hidden, 'but not deleted'. Indymedia is, therefore, a service that spawns a kind of users who are active in creating information, and who contribute to the emergence of shared knowledge and truths. The authority that 'creates' such truths is decentralized and participative and, moreover, it is also an ethical sort of authority (since it is a collective of human individuals), and not a 'mathematical authority' (i.e. an algorithm).

To question official sources by showing that it is possible to produce credible information in a decentralized and independent fashion is one of the aims of Indymedia.org, and also of many other networks that have emerged around specific issues of interest.

A question that now remains, however, is whether it is better to make information public, or to keep it private? An interesting answer to this question comes from the Freenet.org project, which is a decentralized P2P network, that was initiated in order to thwart censorship, and which makes use of the resources of its users (bandwidth, hard disk storage) in order to make available any type of information. Freenet was built with anonymity and security in mind, rather than with transmission speed. The government, and other bodies that restrict information, all have one characteristic in common: they employ censors who decide which information to let pass or to suppress, and what is offensive and what is not. Freenet is a network that grants nobody the right to impose its own scale of values: nobody is able to effectively decide what is acceptable or not, and technology serves the purpose of unlimited freedom of expression.

When using non anonymous networks, strong crypto is the way to go, if we want our information to reach only pre-established recipients – actually, using crypto is a basic rule if a minimum of confidentiality is to be obtained in digital communication. Cryptography enables you to use networks in a subjective and filtered manner, creating private exchange spaces on the users' side, but also public spaces that are indexable and open for use by anybody. What is important is not so

much to be able to hide something, but to preserve private spaces and to be empowered to decide in an autonomous and independent manner what we want to make public, and how and when.

Another option is to make everything public, or even better, to decide to make public a completely subjective take on oneself, that is 'liable to be searched and read'. A virtual identity (or a digital clone if you like) can be defined by a great economy of details, without it being left to the mercy of profiling techniques. Probably the most interesting idea at the moment is the 'FoaF' community, or 'friend-of-a-friend'. This project aims at creating a set of machine readable web pages describing individuals, their field of interest, what they are doing in life, and what their mutual relationships are. This way, the concept of 'trust' takes precedence over that of 'truth': I tend to trust friends of my friends by engaging in 'networks of trust' which are based on shared affinities, tastes and passions. FoaF is a way to create social networks, by promoting an active involvement: to join a FoaF network one must 'come out', describe oneself, and make oneself 'public'.

As seen from the point of view of 'trusted networks', FoaF may be a guarantee of transparency with regard to the itineraries of our virtual avatars: it fosters more credibility and trust in interpersonal relationships, which found their origin and were developed on the Web. The web, then, is being used to create spaces in which people are connected to each other in a big relational map, which one can crisscross, starting from whichever node, and without the need of having to go through a centralized searching tool.

It is even possible to use a formula like FoaF for explicitly political aims: the Indyvoter network, for instance, presents itself as 'a social networking website for political activists', and has as stated objective the bringing about of an alternative form of government.

Oppositions like nature vs. culture, objective vs. subjective, true vs. false turn out to be poor tools for real understanding. Information technology is by definition dual and hybrid in character: it is theoretical and practical at the same time, it creates objects which alter our way of thinking, and the use of these objects in its turn modifies the (information) technology itself. The digital domain is very real, and in reality, our black-and-white opinions make room for grey tints, and for an endless variety of colors, for all shades of opinion, for the differences which turn out to be enrichments, for the heterogeneity which cannot be reduced to one single format. The means to alter, extend and multiply these spaces of freedom are there at our disposal: their potentialities can only be curtailed by our lack of depth and of imagination.

CONCLUSION

We have now arrived at the end of our exploration, having unearthed and hopefully shed light on a number of the more or less substantial secrets of the Mountain View colossus. We have seen that Google profiles itself, with some pride, as the device that is able to integrally manage the complexity of what knowledge is available on the Internet. It 'sells' answers as objective truths that are actually nothing more than the outcome of subjective trajectories filtered by search technologies and algorithms.

We should be careful not to fall in the trap of an 'esoteric' perception of this mechanism, and let ourselves be fascinated by the speedy returns to our queries. These almost mythical portals are, in fact, no more than smart strategies combining the use of advanced systems of collecting, stocking, retrieving, and ordering data, together with direct and indirect profiling and personalization of advertisement targeting. And on top of that, state-of-the-art marketing and sophisticated communication management are the hallmark of Googolian 'evangelization': see for instance the use of primal colors in the logo's visual identity. Add to this the spread of highly configurable interfaces, which keep the firm's distinctive outlook under all circumstances – and the trick will always work: the firm is able to enjoy the milking of the relational economy at all the levels of the interface thanks to correlation between users.

And finally, Google has adopted the co-operative forms of development that are typical of F/OSS communities, cutting on the costs of its services, while at the same time appearing to champion the cause of open access and distribution of knowledge. However, to refuse the hypocrisy of 'the perfect search engine' does not necessarily mean calling for a boycott (wasn't it only because of the fact that members of the Ippolita Collective themselves often made use of Google during their research for this book!).

In the same way, resorting to large, common and freely accessible resources such as Wikipedia has proven to be very useful from an (en)cyclopedical viewpoint. This can be explained by the fact that, if one knows something about the issue at stake, one can verify the correctness of information in an independent manner, by rationally blending together bits and pieces from the Web. The critical use of sources hinges on the ability of people to evaluate the trustworthiness of information themselves; it does not depend on the inherent 'goodness' of digital technology.

Information technology is not merely a device for the automatic management of information. It has its own logic, meaning that it constantly adapts and transform its own basic structures. IT is at the same time material, theoretical and experimental: it adds to the formalization of language (and hence of knowledge), applies the results to the material components of computers, and out this

come languages which influence in their turn the theories of knowledge, making for a feedback loop type of evolution.

Google pushes this feedback loop logic to its extremes: it is an extraordinary machine that manufactures itself through the very use its users make of it. In this sense it is an 'autopoietic' machine, which accumulates all the basic information that millions of users insert into the Web on a daily basis (such as names, pictures, e-mails, search preferences, membership of forums, blog writings and readings, filling in of forms and surveys, browsing trajectories, etc.) and uses it for targeted, 'capillary' advertising.

The data furnished by users have come to represent a gigantic human, social and economic capital. A capital that surely needs protection, but that said, it also constitutes a fantastic territory for questioning, experimenting, and giving free reign to curiosity. Google responds to users' search intents in a flexible manner, and this response surrounds itself with a bevy of ever more sophisticated and customizable services. However, this multiplicity is just a facade, and its only aim is to spread a form of consumerism that conforms to the relational economy, by way of the mass personalization of products and the advertisements thereof. The abundance capitalism of Google emerges from a carefully crafted branding at all levels of the imaginary of the consumers-producers, a.k.a. 'prosumers'. This is made possible by users as they deliver their personal data, as well as their impressions and suggestions about the use of these services, free of costs; and also by developers, as they contribute to the development of 'open tools' which have been provided to them with the sole aim to spread the Google standards, and which remain under the strict purview and control of Mountain View; and finally, it is also made possible by the employees of the Googleplex and other subsidiary data centers that fully endorse the 'philosophy of excellence' as it is being championed by the firm.

The profiling of the imaginary is but the last phase of the process of capitalist colonization of the networks, something we have called technological masturbation. A mercantile spirit spreads statements in favor of 'individual free expression', on the condition that it can exploit these' expressions', so it can sell trinkets and other useless, but personalized goodies.

Google advertises its 'economy of search' as if it were a new cyber-democracy enabling hundred of millions of individuals to communicate directly with each other and to manage their own organization, escaping the control of the state and other institutions in the process, thanks to the firm's technological implements. This simplistic message unfortunately finds support with many 'democratic' media and intellectuals all over the world, who are victims of self-delusion. According to these, the Internet is essentially democratic by nature: not only are individuals stimulated to supplant institutions on the Web, the institutions themselves are becoming better in the process. Technocratic enthusiasm even goes as far as representing the informatization of public administration, a phenomenon known as 'e-governance', as a form of ideology-free governance that mobilizes the commitment of netizens.

This new political identity actually brings about first person (digital) participation, and hence the emergence of a completely diffuse public opinion. As if it was possible to remedy the 'crisis of representation' of the classic forms of political institutions by a networked local, but globally connected democracy! We have attempted to identify the major deficiencies of this approach, which can all be attributed to their ideological preconceptions. The basic idea behind these preconceptions is that technologies are 'neutral' by definition, and that this alleged neutrality stands for moral virtue, in so far as it is the outcome of an objective scientific research and practice, which is able to give every individual what she wants, quickly and effortlessly.

The complex informational mediation performed by Google is presented as a transparent, high-tech skein, which guarantees the users-citizens-consumers', who 'use-vote-buy', a free choice as they surf on the 'free' Web managed by Google for the commonwealth. Despite all these participative dreams – which are fed by cyber-democratic fantasy, but are actually devoid of concrete substance – it is in fact impossible to put truly autonomous forms of direct democracy in place by centralizing information, knowledge, and power, and by putting all these in the hands of a private company (e.g. Google) – and to a lesser extent, in the hands of a government body (e.g. the Telecom Regulatory Authority).

Even the more progressive margins of the alter-globalist movement have not escaped the identity trap, as they call for a reformatting of class identity through a new centralization of work, this time of the telematic kind. However, they remain far removed from the sphere of individual desire, especially when they advocate social networking, as if it were a magic solution to all personal frustrations, achieved through a ritual of global technological (auto)solidarity.

Only a choice for self-education can truly pave the way for escaping technocratic domination. And a lot of work has to be done before it becomes possible to 'put into the commons' something of one's own and to have them create synergies. Without sound technical preparedness, the so-called community bonanza rapidly turns out into a solipsistic exercise. The people who are administering networks, on their side, must learn to protect sensitive data and start drawing the line between what they want to make public and what they wish to keep private. Moreover, they must be able to decide which information is 'correct' and which one is not, based on their subjective evaluation at any given time. This is important, because they must be conscious that they are altering the information landscape at the very moment they browse through it. This is the only way in which individuals can develop their autonomy: by evolving rules for the journey through the virtual landscape, and by developing a personal viewpoint.

Just like all technologies, the digital ones are neither good nor bad in them-selves, yet, as we have seen, they are not neutral either: it all depends on how they are being used and on the methods that have governed their development. And since they are hybrids with the power to influence real life, they surely also enable us to highlight the contradictions between 'nature' and 'culture'. This, in turn, makes it possible to conjure another danger: the idea of the Web as a dematerialized experience, devoid of physical existence, which often leads to a blind and reactionary rejection of innovation. Following this perception, the 'virtual' reality of cyberspace is replete with insignificant

interactions, triggered by an 'online crowd that is blatantly unaware of the material disparities of real life: gender, race, wealth, social position, all set aside in the fluid and frictionless flow of fictional identities.

This completely materialistic idea is usually advanced by intellectuals and other elite observers who dissect digital technologies from the height of their pulpits without ever having the modesty to ask for the opinion of the 'kids' who grew up with these same technologies. However, quite on the contrary, the 'virtual' reality is so physical that it would not even be able to exist without mechanical machines, the silicon sand, the integrated circuits it is constituted by, and the biological machines, that are the users. Connection, multiplicity and de-territorialization are not the same as 'immateriality'. Moreover, this attitude betrays a fear to see the world change and to be left behind, together with profound misgivings about the ability of individuals to transform and enrich themselves.

Digital technologies hence will only be an agent of liberation if they go hand in hand with the development of complex and conscious digital alter egos who are able to interact in an unforeseen manner. It is possible to use a multiplicity of languages to bring about a place where we all can meet.

Among other things, the Ippolita has concluded that it was essential to have recourse to the scientific method, to turn to the inexhaustible richness of the humanistic tradition, to make use of the dialogic force of political opinions, to benefit by the coherence of the feminist narrative, and to head for the limitless curiosity that is the hallmark of hackers. Trust in the possibility to tweak technologies in accordance with the desire of individuals is essential if one wishes to create networks that are really free, and not merely digital. The chaos of contradictory messages, the at times ear-deafening noise amidst the signal, and the near-inconceivable dimension of the Web may well instill fear – and yet the voyage of exploration has only just begun.

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