

A historical and systemic perspective of surveillance capitalism

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1 Introduction

Data are the new oil, Facebook obtained a gross revenue of U\$ 55.83 billion in 2018¹, Alphabet, Google's holding company, earned U\$ 126.8 billion, in the same period², a growing and current market, based on Surveillance Capitalism.

Shoshana Zuboff (2015) popularized the concept of "surveillance capitalism" that denotes a new type of capitalism monetized by data acquired by surveillance, and often on the margins of ethics and legality. The author attributes the emergence of this new form of capitalism to the conjunction of vast digital powers and the indifference and intrinsic narcissism of financial capitalism, within the neoliberal perspective, in the face of the new dependence on the global architecture of digital mediation that produces big data, and a new expression of power that she calls "Big Other".

According to Zuboff, the Internet was a kind and promising world, now it is where capitalism is developing in a perverse and overwhelming way, by extracting data, threatening freedom and privacy. The Internet was a vast field of possibilities and opportunities to be explored, a space for democratization of knowledge, and full of optimism, as John Perry Barlow(1996) describes in the "Declaration of the Independence of Cyberspace", based on freedom, equity and democracy.

Doc Searls and David Weinberger (1996) also coined a manifesto, this time about what the "Internet was or was not", the nuclear concept of the manifesto "The World of Ends", focused on the main structural characteristic of the Internet, a distributed network, without a center, without owners. The value according to the manifesto grew on the periphery of the Internet, at the ends. "The Internet interprets censorship as a defect and routes to circumvent it," a classic phrase by John Gilmore, included in the manifesto, is the expression of empowerment and freedom, almost a war cry uttered by all Internet lovers.

For many years the value grew at the ends, feeding a windy economy, which ended up becoming the "Internet Bubble", which burst in 2001. The bursting of the bubble was not responsible for affecting this prosperous economy, it decimated thousands of companies with unachievable proposals, leading to the professionalization of the market, which began to seek new and promising business models.

The distance between the Internet imagined in 1996 and the current Internet in 2019 is so great that we don't seem to be talking about the same Internet. Understanding and reflecting on this change was the theme of the conference "The Web that Was: Archives, Traces, Reflections³", organized by the University of Amsterdam, which took place between June 19 and 21, 2019. The call for the works opens with this paragraph:

As the first generation of web users get gray, it is clear that the internet they remember is no longer present. That Internet is now simply the object of nostalgia. Technology's birthdays are ten cents, while cool digital aesthetics has made several ironic twists. All this reinforces the feeling that we leave behind a digital story as clumsy and slow as it is idealistic and naive.

Publications such as "The Ends of the Internet" by Boris Beaude, "The Culture of Connectivity" by Jose van Dijck, and "The Net Delusion" by Evgeny Morozov are some of the studies already published on this reflection. Jonathan Zittrain (2008), one of the first to write on the subject, criticizes the centralization of the Internet through business models based on "black boxes", such as iPods, iPhones, Xbox and TiVos. For him, this business model creates a kind of counter-revolution, killing innovation on the Internet, and increasing its regulability by the market. For Zittrain, the Internet access experience is being shaped according to the device with which the user accesses it. This same understanding can be used to analyze the "digital black boxes", which are the current platforms such as Google, Facebook, Alibaba, WhatsApp, Netflix, and etc...

Shoshana Zuboff (2015) treats this change as "Structural Independence". Unlike the need to balance the income of the population with the prices of the goods produced, to move the "wheel of the economy", of twentieth-century capitalism, the surveillance capitalism, breaks with this premise, creating a structural independence, where the population is no longer necessary as a source of customers and employees. Structural independence means that the company, in surveillance capitalism, needs only the data of the individual, with which it builds profiles that will become its assets. Hyperscale through increasing automation, and scalable technologies in clouds, allows these companies to operate with smaller and smaller staff, having the algorithms as "means of production". This structural independence of companies from the population is a matter of exceptional importance in the light of the historical relationship between market capitalism and democracy.

It is possible that surveillance capitalism has been built from a succession of failures, events and opportunities, perceived or built in various "baskets" and perspectives, in different contexts, but somehow coordinated. Technical, behavioral, legal, economic, social and structural aspects need to be observed in this construction. The concept of "baskets" comes from the book "An Introduction to Internet Governance", by Jovan Kurbalija (2016). The book structures, which can be understood as "information policies on the Internet", in five domains of political and operational construction, which it calls baskets: Infrastructure and standardization basket, legal basket, economic basket, sociocultural basket, and development basket.

2 A starting point, business models

Shoshana Zuboff (2014, 2015, 2016) does not clearly establish when surveillance capitalism emerged, its systematization took place from the research of Hal R. Varian.

In 1994, just before the commercial offer of Internet access, Nicholas Negroponte⁴ from MIT, researched the massive offer of channels on American cable TV. He imagined it was impossible for the user to choose good programs, only with the remote control. Negroponte's proposal was a smart TV, which would learn from the user's interests by offering him the best

programming, without having to worry about it, thus improving the "**user experience**". This proposal was developed for what Negroponte called "**smart agents**". In the wake of this idea, Microsoft released "Bob" and Apple "Newton" two intelligent agents who were a great failure (PARISER, 2012).

Jeff Bezos of Amazon reached the mark of one million book customers in 1997. Amazon developed a relevant solution based on customer data and behavior: which books they searched for, bought, shared, put on wish list. It was the first "intelligent agent" that really worked. Bezos based his method of relevance on the neighborhood bookseller, who knows the interest of each client (idem).

By "observing" customer behavior, with the objective of offering books with a greater chance of purchase, Amazon paved the surveillance capitalism, in other words, Amazon extracted data from customers, and modeled them in the search for patterns, and through homophily⁵, established relationships, producing indications for the customer, aiming to "improve" their experience. Ten years later, in 2007, Amazon launched Kindle, the e-book reader, and also began to extract data from its customers' reading habits, such as interest, reading time, highlights and text sharing (idem).

Search engines such as Alta Vista, InfoSeek, Lycos, Yahoo and even Brazilian Cadê, initially worked as directories, in which the Internet pages were registered manually. This procedure worked concomitantly for a few years with web crawlers, which powered these databases. The indexing of these pages was done in a structured way, by categories and keywords, and the result of the searches presented to users, did not take into account any criteria of significant relevance. Larry Page and Sergey Brin created the concept of "**PageRank**" at Stanford University in 1996 as part of a research project. In the construction of the PageRank metric, the Internet is seen as a network of academic citations, each node corresponds to a page, and each link (hyperlink) a reference between pages. The PageRank metric assigns values to pages (nodes), according to the quantity and relevance of their links (VISE, 2006).

Google, founded by the creators of "PageRank", emerged in 1998, but only the following year, adopted the "PageRank" as the main indexing criterion. The operationalization of Google takes place through Googlebot, a scalable tracking robot, built to work in multiple instances, browsing the hyperlinks, building the databases that feed the PageRank, and extracting copies of the web pages they visit, storing them on Google servers, creating the "Google Cache", aiming to improve the user experience. One issue pointed out by Bernard Girard (2009) is that Google's ambition was to store as many web pages as possible. This ambition became possible over time with the exponential reduction in the cost of storage per Gigabyte, which in 1994, was of the order of \$686.00, falling to \$0.03 in 2014⁶.

In 2003, Google launched AdSense⁷, an innovative advertising system, being quickly adopted as the main source of income for most websites and blogs, becoming the new standard in Internet advertising. Google's advertising system, "borrowed" from GoTo, Overture's advertising service, created in 1998, differentiated from the practice of the market, by charging per click (Cost Per Click - CPC), while competitors, such as DoubleClick charged per view (Cost per Millions - CPM), selling lots of thousands of views. By adopting

the cost-per-click strategy, Google limited the advertiser's risk and reduced the uncertainty of impacting the appropriate audience (GIRARD, 2009).

Overture invented CPC, but Google innovated advertising by allowing the creation of minimalist ads, composed of only 10 to 15 words, including the advertiser's URL. This service, known as AdWords, was created thinking about the initial proposal to offer advertising on the pages that displayed results of the searches carried out in its search tool, ensuring contextualization and increasing the possibility of receiving a click, thus optimizing the experience of the advertiser. One of the successes attributed to AdWords is the fact that the entire process of publishing and monitoring the campaign is automated. Google has reduced the learning curve, making this task simple, eliminating the need to hire representatives and sellers, dialoguing with the **hyperscale** process described by Zuboff (GIRARD, 2009).

In 2007, Google acquired DoubleClick, and with it its tangible and intangible assets, starting to offer advertising in formats other than the minimalist AdWords, which in July 2018, was renamed Google Ads.

Amazon, through its partnership program, "Amazon Associates", enables the monetization of websites and blogs through the payment of commissions on the sale of its products, a different model from Google AdSense, but with very similar operational characteristics. To operationalize these forms of monetization, website and blog owners insert specific codes into their pages. These codes work as true "windows" for Google and Amazon on their websites, allowing them to access their own cookies, but with additional information about the site the user is visiting. These "windows" are known as "**tracker cookie**", or simply tracker. Even if the user does not buy any product, or clicks on any ad, the tracker allows to extract information from the visited site, relating you to it. Page content, time of stay, screen scrolling, clicked links, items consulted (if it is a virtual store), referrer (how the user arrived at the site), are some of the possible information to be extracted with the help of tracker. By browsing through several pages that have trackers, the user involuntary allows Google, Amazon, Facebook, Twitter, and others to extract the data from their browsing.

A practical application of the tracker is the remarketing service, offered to virtual stores, by Google, for example. Remarketing makes it possible to present an advertisement with the items "abandoned" in the shopping cart, or consulted, on any site that has the Google Ads service. It is a clear practice of marketing behaviors.

In 2004, with the launch of Orkut and Gmail, Google began to obtain the profile data of users, enabling their positive confirmation, associating anonymous identifiers to this data. In addition to the possibility of extracting profile data, and personification of the user, these two new products allowed to extract data of interest and relationship networks of users. Orkut, a social networking tool, has now allowed a dynamic real-time extraction of relationship maps and profiles, interests, and patterns. The possibility of publishing photos, including profile, brought the face of the individual, and the beginning of the culture of self-exposure on the Internet. To make Gmail an instant success, Google offered a free storage of 1Gb of email data, this was 500 times greater than the service offered by Microsoft, and 250 times greater than in Yahoo (VISE, 2006).

Google launched the "Custom Search" and "My History" in 2005, when it supposedly began to store the queries performed by users, and in this way by extracting, modeling and comparing this data, it allowed to contextualize the searches, presenting even more personalized results, improving the **user experience**. Supposedly, because Google already stored the navigation information extracted by the tracker, since the launch of AdSense in 2003. Google not only extracts data from user queries, but also extracts data from the HTTP header⁸, such as computer or device model, operating system version, browser model, language and IP number. Based on the IP number⁹, it is possible to identify the geographical coordinates of the user's access location with reasonable precision using GeoIP (Geolocation by IP)¹⁰.

In 2005, Google also launched Google Maps. Google Maps is the result of the acquisition of three companies: The Australian Where2, which developed the technological core of interactive map visualization. And the American Keyhole, a geospatial visualization company; and ZipDash specialized in real-time traffic analysis. The initial concern was linked to geographical security issues, although the satellite images used were not updated, they displayed the location and layout of the buildings. With the launch of Google Street View in 2007, with 360o photos, from special cameras installed in vehicles identified with the Google brand, many controversies arose around the uncensored nature of the photos, resolved with the blurring of the faces and car licenses eventually captured.

With the growth of the penetration of smartphones, from 2012, that the "timeline" service of Google Maps became possible, recording the daily displacement of the individual. This service, through the extraction and modeling of GPS data, allows you to identify if it is stopped, walking, by car, or if you have entered a certain building. Positional patterns allow you to determine where the individual lives, works, studies, in addition to his commuting habits (VISE, 2006).

Facebook was launched in 2004, initially for access only by Harvard University students, becoming public in 2006. The popularization of Facebook took place from 2011, with the launch of the "timeline" feature, a feed of "friends" posts on the main screen. Although Shoshana Zuboff's studies focus primarily on Google, Facebook has become the most faithful representation of the surveillance capitalism model. The voracity with which it extracts, stores and processes data from its users to present them with a response in the form of a feed is prominent.

The Serbian research laboratory Share Lab¹¹, developed a detailed study, divided into three parts, entitled "Facebook Algorithmic Factory" (SHARE LAB, 2016), unveiling the "digital black box" of Facebook.

The study is divided into four stages of the "Facebook Algorithmic Factory", data collection, storage, algorithmic processing and target determination. The **data collection** takes place in a dynamic way, and in real time on five distinct sources: **Account and profile information**, which are the registration and informed data, including the information of relationship type, degree of kinship, and new "friends"; **Device information**, model, capacity, IP, operating system, installed applications, general conditions such as battery level, available memory; **Actions and behaviors**, these are the data that Zuboff calls "**data exhaust**", which are data produced in the interaction with Facebook, such as liking, commenting, sharing,

clicking, tagging and interacting with the page. Residual data seems intangible and irrelevant, but it is the one that allows Facebook to know the user deeply; **Trackers**, Facebook makes use of its own and third parties trackers, including Google; **Outside Facebook domain information**, which is information obtained from other Facebook services, such as Instagram, WhatsApp, Onevo, Atlas, LiveRail, Oculus, Moves, Parsex, Mobile Technologies Inc, Analytics Services, and interactivity with Facebook applications on other sites. In another study from the laboratory entitled "Invisible Infrastructures: Mobile permissions" (SHARE LAB, 2015), which details the information of the device, it is pointed out that the Facebook application accesses 42 functions and sensors of the smartphone, among them reading and recording of calendar, phone notebook, SMS, and telephone log, and also accesses the cameras, microphone, list of nearby wifi networks, and geopositioning information; **Storage** is from all extracted data, in the form of raw data, modeled data, and relationship graphs. **Algorithmic processing** is done by machine learning and deep learning, producing information such as psychometric profile, sexual orientation, political position, marital status, routines, values and principles, family income and facial biometrics. The **determination of the target**, which is the moment when the algorithm decides what it will display in the user's "feed", is based on the following factors: Connections, demographic data, user interests and their behaviors. Producing a "feed" containing the relevant content and alerts, paid content, and one or more publications that cause the **user to be hurt**.

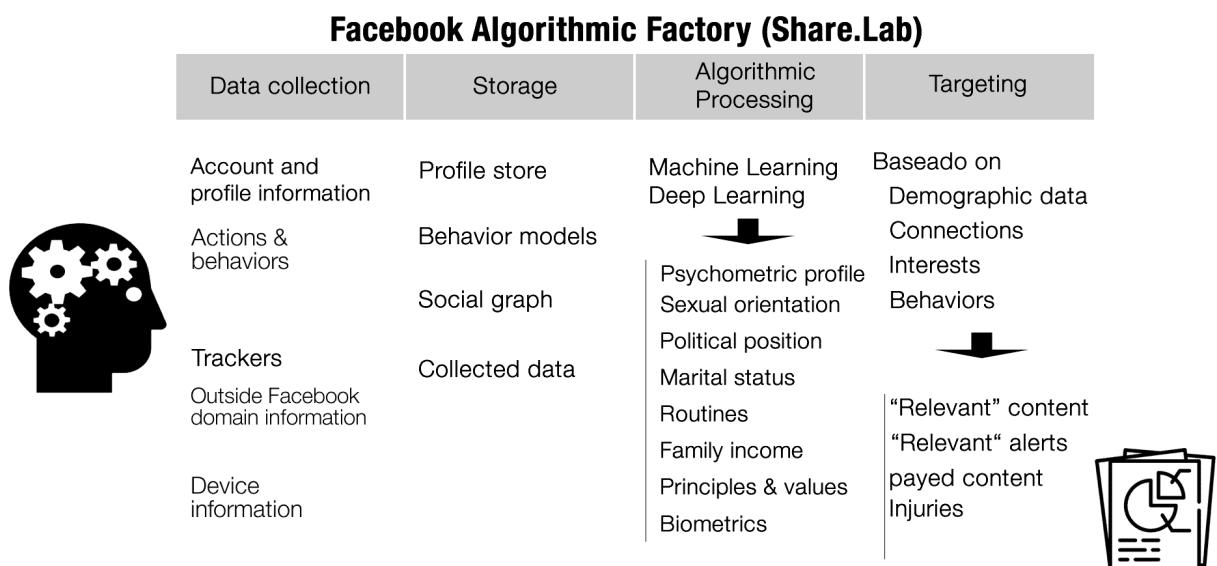


Figure 1 - Algorithmic Facebook Factory (Share.Lab)

In addition to providing good experiences, Facebook algorithms can influence the mood, opinion and perception of the individual's world. The main objective of Facebook is to retain and provoke interactions. According to neuroscientist Molly Crockett (2017), the most efficient way to obtain this result is through the introduction of some posts that cause injury, in the feed. This process resembles the "toxic relationship" model, known as Double Bond. According to Crockett, the networks, in this process provoke an emotional roller coaster in the user, and their consequences are not yet known.

Google, Amazon and Facebook use complex algorithms to intermediate the relationships between users and content. Computer-mediated transactions allowed us to

observe behaviors that were previously not observable, this now allows transactions that were not previously viable, establishing new business models. This is a new commercial frontier composed of knowledge about real-time behavior that creates opportunities to intervene and modify behavior for profit. As a result, people are reduced to mere human biomass, inclined to serve the new rules of capital, imposed on all behavior, through a relentless algorithmic relationship that produces a real-time, fact-based and ubiquitous feed (ZUBOFF, 2015).

The study and correlation of other business models related to surveillance capitalism would not fit in this article. Companies and services such as Waze, Alibaba, Netflix, PokemonGo, Youtube, Spotify, iTunes and Twitter, would deserve a detailed study, as well as the new smartphone payment systems with Apple Pay and Alipay.

3 Other development arenas

The business models of Google, Amazon and Facebook in Surveillance Capitalism have developed on simultaneous development in other arenas. Evolution in habits and speed of access to the Internet, technological development, development of markets, and practices and patterns of design and programming for the Internet, were important factors for this development.

Until 1999, in Brazil, Internet access was from a fixed computer, through a modem of up to 56Kbps, who dialed to an internet service provider (ISP). In 2016, according to NIC.Br (2018), the average access speed in Brazil was 9.6 Mbs, that is, 171 times faster than in 1999. In the early days of the internet, the Web Designers¹² worked on the design of websites, with the concern that the Internet pages did not have more than 200Kb, including text and image, because studies indicated that the user would abandon any page that took more than 10 seconds to load (King, 2003).

From 2000, broadband access reaches the main capitals of Brazil, at speeds between 128Kbps and 512Kbps, establishing new habits. The model of internet access also changed. Previously, access was mediated by small ISPs that provided access to telecommunications networks. With broadband access, the telecom companies themselves began to provide access.

Broadband has brought permanent connectivity to the Internet, producing new usage habits. Interactions have become real-time, social interaction platforms such as online forums have become popular, as well as ICQ and MSN¹³.

With broadband Internet access, without the need for extremely optimized pages, the design took over the Internet, creating a period of a lot of experimentation and beauty. Contrary to this aesthetically experimental internet, Steve Krug (2000) comes up with the book "Don't make me think!", and the concept of "usability on the Internet". Krug advocated a functional design, planned to be intuitive, leading the user throughout the site. Its application brought to Web Design the practice of observing the behavior of users in relation to Internet pages, from the usability laboratories, creating new professional specialties as a usability specialist, UX and Interface manager, opening a new and promising behavior extraction market to improve the design of Internet pages and interactive interfaces.

The science of usability brought to Web Design some areas of knowledge of Information Science such as information architecture, taxonomy and folksonomy, knowledge management, and also cognitivism, heuristic study and behaviorism of psychology. It brought

positive aspects, such as the reduction of the learning curve, visual mediation of information, putting a little organization in the natural chaos of the Internet; but it also brought questionable aspects such as the ability to manipulate user behavior by design.

One of the problems faced by Web Designers until 2002 was the lack of pattern caused by the so-called "Browsers War". Until 2001, the dispute for the browser market was led by Microsoft Internet Explorer and Netscape. Microsoft delivered its browser installed and integrated with the Windows operating system, and adopted the practice of creating custom HTML tags, as well as Jscript instead of JavaScript, while Netscape used Javascript and followed the HTML markup standards of the W3C¹⁴. Any Web Design project had to consider these variables, and often bypassed them with scripts that identified the browser, sending the page in the appropriate format, many sites had redundant pages, one for Internet Explorer and one for Netscape and other browsers (ZELDMAN,2003).

XHTML¹⁵, published in 2000 by the W3C, became popular from 2002, by allowing to separate in a structured way the content, design and application of the web pages. This practice has become known as Web Standards for following W3C standards. Web design began to use XHTML as a markup language for the content of the pages, and CSS¹⁶ (Cascade Style Sheets), to build the layout, producing clean and structured codes. Before this, the layout of the pages was built with tables, creating a complex HTML code (ZELDMAN, 2003).

Until 2005, most Internet sites had synchronous behavior, even transactional ones such as Orkut, Google and Amazon. This means that the pages were built dynamically on the server, and sent in the static HTML or XHTML format to the user. Once displayed in the browser, the page did not change or sent and received data, until a button or link was triggered. Only pages that used Adobe Flash¹⁷ or Java could produce asynchronous behavior. These pages with asynchronous behavior were part of what was known as RIA (Rich Internet Application). Rich Internet applications were novelties before 2005, pages that allowed interactivity on the client side (in the user's browser), updating data in real time, were innovative.

The processing capacity, in addition to memory, form and speed of access were catalysts for these changes. A 2018 iPhone X has 172 times the processing capacity of a 1996 top-of-the-line computer, the Pentium 100MHz.

AJAX (Asynchronous JavaScript And XML), which emerged in 2005, is a set of Web Development techniques that use some technologies in the "client side", to create asynchronous Internet applications. With AJAX, Internet pages can send and receive data from servers asynchronously and in the background, without interfering with the visualization and behavior of the page being displayed. Using technologies such as JavaScript, XHTML, HTML and CSS, it is possible to build and rebuild parts of the page that is being displayed without needing to reload it. By operating in the background sending and receiving data without interfering with the visualization, AJAX can be used to extract residual data from the user, and send it to the server without him noticing.

Mobility made possible a great leap in surveillance capitalism, thanks to smartphones, which became popular in Brazil from 2012 with 18% penetration, reaching 87% of the

population in 2017¹⁸. Mobility has now allowed the permanent use of the Internet, from anywhere. New data began to be extracted from the ability of the applications to access various sensors and features of the smartphone. Mobility has made viable applications such as Waze, UBER, Moovit, Runkeeper, Strava, which operate from geopositioning data extraction.

Mobile Internet access by 3G/4G has specific technical characteristics that have led mobile network operators (MNO), to establish a monthly franchise in data consumption (Data Cap). According to the TIC Domicílios 2017 survey (CGI.Br,2018), 49% of Internet users use only their smartphone to access the Internet in Brazil, and 22% of these users (11% of the total), use only 3G/4G to access the Internet, focusing mostly on classes D and E. This means that these users access the Internet under economic restriction, limiting their options, building differentiated usage habits, this is because MNOs usually offer Facebook, WhatsApp and other "free" applications, characterizing a commercial practice known as "Zero Rating".

For Bauman and Lyon(2013), the architecture of electronic technologies allows forms of control with different faces, including sharing the characteristics related to consumption and entertainment, pointing to surveillance and self-surveillance as new behavioral perspectives of the individual in the face of technologies, who even feel happy and motivated to share intimate details of their personal lives such as photos, facts, events and thoughts. Technology has been transforming the watched, the watchman's servant, through self-surveillance, twenty-four hours a day and seven days a week, as the authors emphasize. Bauman and Lyon use the concept of personal panopticon as the device that makes the individual vigilant of himself and his peers, paving the concept of portability that surveillance acts in a decentralized way (CARIBÉ,2018).

It is interesting to note how far technological development allowed new design and development practices for the Internet. Applications in AJAX would not be able to work on the computers of 1996, the Internet standards (Web Standards) would not have become so popular if the Browsers War had not created so much inconvenience. The case of smartphones in Brazil shows that the market response is important, with 5% of the Brazilian population with smartphones in 2009, applications that make use of mobility would not have economies of scale to subsist. With penetration close to 90%, they have become the main auxiliary tool of surveillance capitalism.

4 New frontiers of surveillance capitalism

Internet browsing is based on the exchange of information, which are premises of the Transmission Control Protocol (TCP) model, which includes the set of TCP/IP protocols, consisting of four layers: The network access layer; the Internet layer; the transport layer and the application layer. The network access layer is the physical layer, also known as the **infrastructure layer**, composed of cables, modems, routers, root servers, among other equipment. The Internet layer is known as the **network layer**, responsible for the interconnection of the different networks, establishing the functionality of the infrastructure. The **transport layer** controls "host-to-host" communication, using protocols such as TCP/IP, UDP, and others. These protocols are responsible for converting data into data packets, addressing them and determining the route, together with the internet layer. Protocols encode specific rules, and within this aspect they are strategically targets of traffic policies and network management. The **application layer** is in fact the "Internet" that users know: browsers and applications, which access websites and remote data using other protocols and

scripts. It is important to note that the layers act in a coordinated way in the collection, coding, transport, storage, retrieval, distribution and decoding of information on the Internet.

What is to demonstrate is that in surveillance capitalism, data extraction usually happens in the **application layer**, but recent events draw attention to new extraction possibilities, still in the **transport layer**.

One of the relevant themes during the "20th ITU Plenipotentiary Conference" (PP-18)¹⁹, which took place between October 29 and November 16, 2018 in Dubai, was the approval of the resolution (WGPL/3) with the objective of outlining the scope of ITU's activities related to OTTs (over-the-top) services, provided at the application layer, above the telecommunications infrastructure layer. Facebook, Google, WhatsApp, Netflix and other platforms are examples of OTTs. The pressure for this resolution comes from what industry experts are calling the "**Submarine Cable Bubble**". Projects such as MONET²⁰ (Google, Antel, Algar and Angola Cables), a cable with the capacity of 64Tb/s connecting Boca Raton, in Florida (USA), to the cities of Fortaleza (BRA) and Santos (BRA); MAREA²¹ (Telxius, Facebook and Microsoft), a cable with a capacity of 160Tb/s, connecting Virginia Beach in the USA to Bilbao in Spain; MALBEC²² (Globenet and Facebook), with uninformed capacity, connecting Rio de Janeiro (BRA), Praia Grande (BRA) and Buenos Aires in Argentina; TANNAT²³ (Google and Antel) with 64Tb/s connecting Santos(BRA), interconnecting with MONET, with Maldonado in Uruguay; And two cables of exclusive use of Google: JUNIOR (Google), with 16Tb, connecting Rio de Janeiro and São Paulo, and CURIE²⁴ (Google), connecting Los Angeles (USA) to Valparaiso in Chile.

The movement began in the dispute for Internet Neutrality, the same neutrality that was guaranteed in Brazil by the Marco Civil da Internet, and broken in the US by determination of the American agency FCC. In a nutshell, internet neutrality, network neutrality, or simply neutrality, is the guarantee in the layers of infrastructure, internet and transport, that all data packages have the same traffic priority. The telecommunications companies that offer these layers aim to charge differentiated values according to the service that is being accessed by the user, origin and destination of the data packet route. This dispute is not recent, it has been since 2010, when telecommunications operators understood that the OTTs had a revenue disproportionate to what they paid for the telecommunications infrastructure. The OTTs, on the other hand, understood that they guarantee traffic in telecommunications networks, bringing new customers. From this impasse emerged the "Zero Rating" agreements in mobile telephony, these agreements ensure that telecommunication companies do not cover data franchise, when users access the OTTs that are part of the agreement. This pressure is expanding to fixed internet networks, under the argument of creating a data franchise, known as "Data Cap", limiting the volume of data consumed by broadband connections.

5 Conclusion, barriers and limitations to surveillance capitalism

Shoshana Zuboff (2016), in the article "Secrets of Surveillance Capital", explored practical issues of the operation of surveillance capitalism, she begins by identifying the main objective that is to scale modification of people's behaviors. According to Zuboff, the attack on behavioral data is so comprehensive that it can no longer be circumscribed by the concept of privacy and its disputes. She describes it as a four-point equation: Obsessive expansion in data capture spaces, what it calls behavioral surpluses; Modeling of this data by big data techniques; Creation of behavioral prediction products; Marketing of these products.

Considering that data is the main asset of surveillance capitalism, imposing limitations on its extraction, transport, processing and storage, it has been the subject of personal data policies. Europe is a pioneer, and already has a legal framework for the protection of personal data known as GDPR²⁵. In Brazil, the General Law on the Protection of Personal Data (LGPD)²⁶ in 2020.

The understanding of the layers that make up the TCP/IP structure, from the perspective of surveillance capitalism allows you to observe in which layers data extraction is possible, in addition to the usual extraction in the application layer, it is also possible to extract in the transport layer, this being one of the risks of the concentration of companies with the infrastructure networks described in the Bubble of Sea Cables. By describing the baskets that are part of the Internet governance structure, it is possible to identify what types of public policies can be developed in each of them.

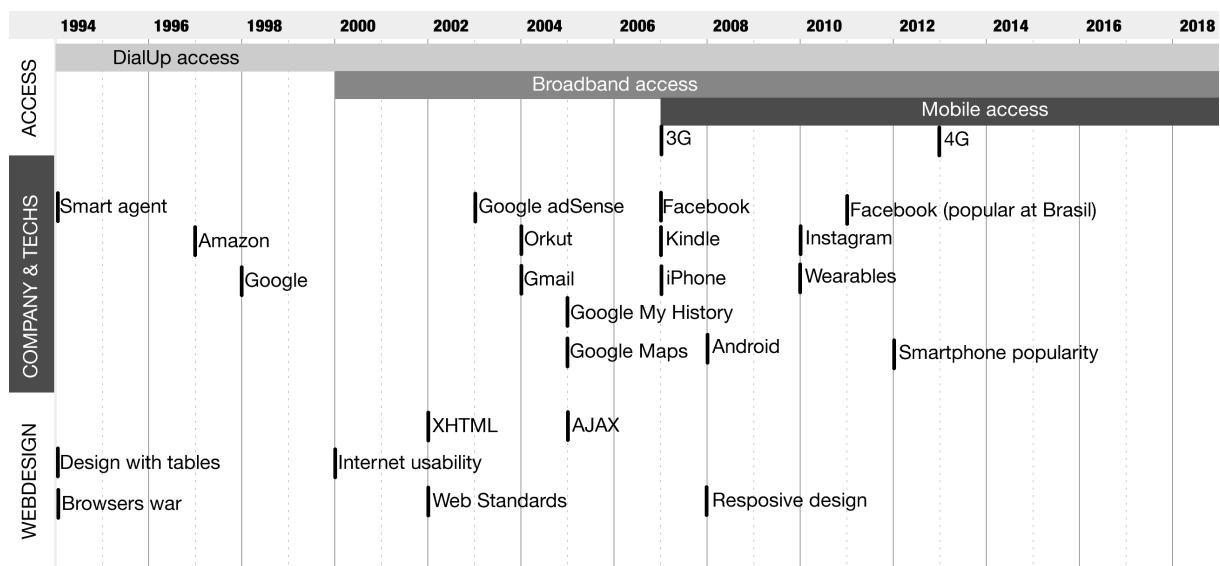


Figure 2 - Timeline of technologies, companies, events and practices addressed

The chronology and systematization of the events allowed us to expose that Surveillance Capitalism knew how to take advantage of every opportunity created, always transforming them and profit, and improving its business of commercialization of future behaviors. This development was, and continues to be, closely linked to the adoption of new technologies by the market, producing an economy of scale, indispensable to big data. Agreements, mergers and acquisitions of companies, have supplied the voracious demand for data and coded behaviors, and continue to supply.

The expansion of the OTTs market through the construction of private Internet infrastructure, as in the case of the "Submarine Cable Bubble", exposed, in addition to the dispute between the OTTs and telecoms, the voracity and size of the market to be embraced by Surveillance Capitalism. This has in its DNA a predatory practice, which is consuming privacy, freedom, autonomy, mental sanity and the rule of law. Now it is eroding the foundations of the Internet, risking transforming it into a fragmented space of networks, expanding the concept of walled garden, since these private networks have their own rules,

and may not follow implicit and explicit laws, agreements and rules that guide the governance of the Internet.

Surveillance capitalism has violated one of the basic rules of the Internet by adding value to its center, and this is destroying it. Violating rules seems to be one of the operational characteristics of surveillance capitalism, which is always developing the margins of law and ethics, intending them, until they are caught, expanding into a new invisible field, in a cyclical way.

All this started from a proposal to improve the user experience in 1994, and since then, this term has been a politically correct expression for the development of surveillance capitalism. This debate, of profound importance for the future of humanity, is just beginning.

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Endnotes

¹ 2018 Facebook financial report : <https://investor.fb.com/investor-news/press-release-details/2019/Facebook-Reports-Fourth-Quarter-and-Full-Year-2018-Results/default.aspx> Access in 04/02/2019.

² 2018 Alphabet (Google) financial report: <https://abc.xyz/investor/> Access in 04/02/2019.

³ The Web that Was - Call for Papers - <http://thewebthatwas.net/cfp/>

⁴ Nicholas Negroponte - <https://web.media.mit.edu/~nicholas/>

⁵ Homophily, a feminine noun that literally means "love of equals", in people's tendency to attract their names. In the context presented, it means evaluating individuals from their homonymous characteristics.

⁶ Cost per Gb in relation to the prices of hard drives, obtained in <http://www.mkomo.com/cost-per-gigabyte-update>

⁷ Google AdSense - <https://www.google.com.br/adsense/start/>

⁸ HTTP Header - When requesting a URL, the browser sends an HTTP request, and at this time sends a series of data about the computer and the connection.

⁹ IP (Internet Protocol) Means "Internet Protocol" and is a number that identifies a device on a network (a computer, printer, router, etc.), when accessing the Internet, the IP number that the server will receive will be the IP number of the modem. https://pt.wikipedia.org/wiki/Protocolo_de_Internet

¹⁰ GeoIP Or geolocation byIP - <https://en.wikipedia.org/wiki/Geolocation>

¹¹ Share Lab - <https://labs.rs/en/>

¹² Web Designer - Professional specialized in designing and creating web sites.

¹³ ICQ - <https://en.wikipedia.org/wiki/ICQ> and MSN - <https://en.wikipedia.org/wiki/MSN>

¹⁴ W3C - <https://www.w3.org/>

¹⁵ XHTML - <https://www.w3.org/MarkUp/>

¹⁶ CSS - <https://www.w3.org/Style/CSS/>

¹⁷ Adobe Flash - https://en.wikipedia.org/wiki/Adobe_Flash and Java - https://www.java.com/pt_BR/

¹⁸ Penetration of smartphones in Brazil - Sources: IBOPE inteligência <http://www.ibopeinteligencia.com/>, Deloitte <https://www2.deloitte.com/br/pt.html> and Teleco <http://www.teleco.com.br/smartphone.asp>

¹⁹ ITU PP-18 - <https://www.itu.int/web/pp-18/en/>

²⁰ MONET - <https://tecnoblog.net/246609/google-ativa-cabo-submarino-monet-brasil/>

²¹ MAREA - <https://news.microsoft.com/pt-br/microsoft-facebook-e-telxius-completam-o-cabo-submarino-de-maior-capacidade-para-atravessar-o-atlantico/>

²² MALBEC - <https://tecnoblog.net/258751/facebook-cabo-submarino-brasil-argentina/>

²³ JUNIOR and TANNAT - <http://www.telesintese.com.br/cabos-submarinos-tannat-e-junior-serao-ativados-ate-o-final-do-ano-diz-google/>

²⁴ CURIE - <https://www.submarinenetworks.com/en/systems/brazil-us/curie>

²⁵ GDPR - <https://eugdpr.org/>

²⁶ LGPD - http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2018/Lei/L13709.htm