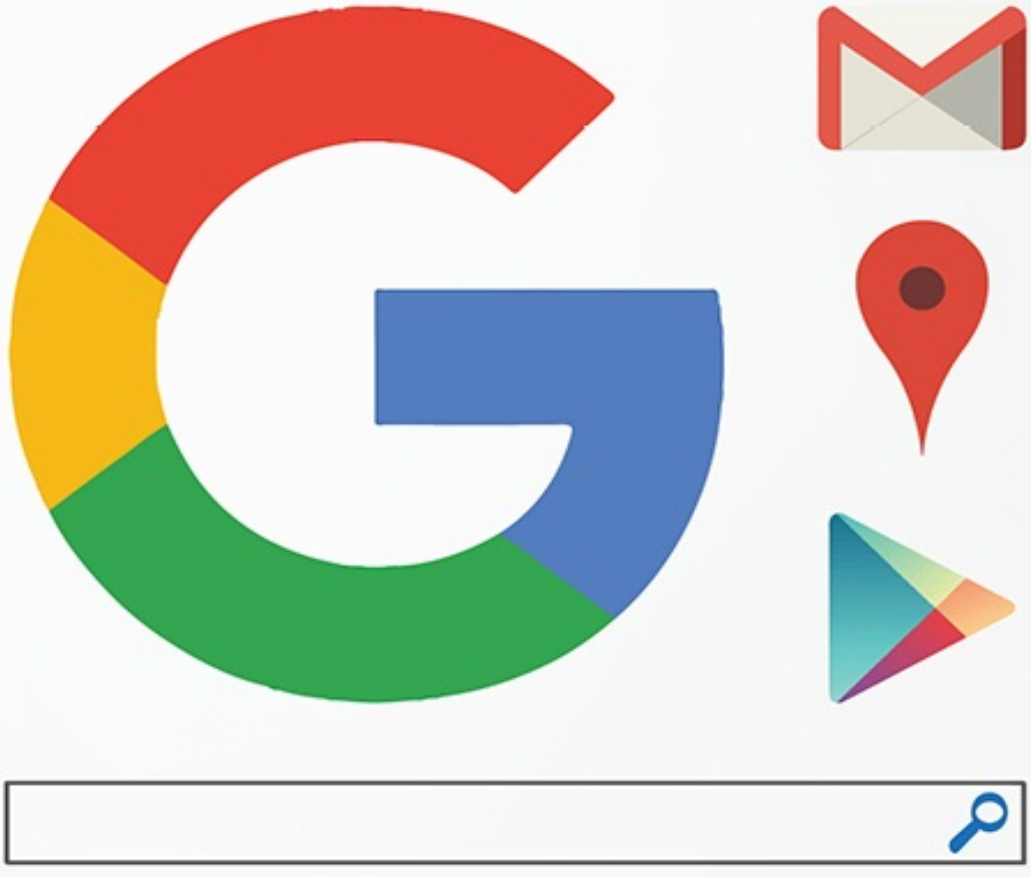
GOOGLE:
MAKING INFORMATION ACCESSIBLE

The search engine that changed the world



Business

50MINUTES.com

GOOGLE:
MAKING INFORMATION ACCESSIBLE

The search engine that changed the world

Business 50MINUTES.com

GOOGLE:
MAKING INFORMATION ACCESSIBLE

The search engine that changed the world

Written by Guillaume Fastré
In collaboration with Soraya Belghazi
Translated by Rebecca Neal

Business 50MINUTES.com

GOOGLE: FROM STARTUP TO INTERNET GIANT

A few months shy of the turn of the millennium, Sergey Brin and Larry Page headed to the offices of Excite, a collection of popular websites and services and one of the leading tech companies of the time, in California. They were determined to sell their company and offered a price of $1 million to the Excite CEO George Bell.

Bell declined their offer, even when Brin and Page dropped their asking price to $750 000. The two friends therefore left the meeting empty-handed and decided to continue developing their search engine, which was designed to classify and organise all the pages on the internet to make it easier to find information. At the time, there was no way they could have foreseen that this rejection and their determination would propel them to the head of one of the 21st century's most influential companies and make them both billionaires.

This book will explain how two students developed a revolutionary search engine that is now used by billions of people around the world. It will outline the principles and strategies that turned Google, which started life as a university project, into a tech empire in the space of just a few years, as well as the obstacles the company has encountered to date and the steps it has taken to overcome them.

After learning about the main stages in its meteoric growth, you will understand how Google was able to succeed in a complex and constantly changing environment and develop an innovative, effective business model.

KEY INFORMATION

- **Founders:** Larry Page (American PhD student in computer science, born in 1973, aged 25 in 1998) and Sergey Brin (Russian-born American PhD student in computer science, born in 1973, aged 25 in 1998).
- **Founded:** 4 September 1998 in Menlo Park, California.
- **Sector:** internet.
- **Key figures:**

- 1999: 3 600 000 searches and annual turnover of $220 000.
- 2000: 9 238 200 000 searches and annual turnover of $19 108 000.
- 2001: 27 474 600 000 searches and annual turnover of $86 426 000.
- 2014: 2 095 100 000 000 searches and annual turnover of $68 000 000 000.
- 2015: 2 834 650 000 000 searches and annual turnover of $75 000 000 000.
- 2016: 4 000 000 000 000 searches (estimated) and annual turnover of $89 500 000 000.

CONTEXT

The purpose of technology has always been to help us perform increasingly complex tasks. The first technological advances date from over 2.3 million years ago with the invention of tools, which was followed by the domestication of fire. This kind of progress has allowed humans to survive, evolve and assert our dominance over a hostile world.

In modern times, humans have used technology to make our lives more comfortable, but above all to stretch our limits and make our wildest dreams a reality. The discovery of electricity, the invention of the jet engine and space exploration would have seemed like pure science fiction to our ancestors, but now form part of our everyday reality.

Creative visionaries have given us the computer and the internet, which are now used on a daily basis by billions of people.

THE COMPUTER

The British mathematician Charles Babbage (1791-1871) was one of the pioneers who paved the way for the modern computer by developing the Difference Engine, an early calculating machine, in the 1820s and 1830s.

However, the computer age only really began a century later, with the development of machines that could carry out multiple operations simultaneously. To begin with, computers were very expensive, which meant that they were only used in research and the military. Their use then became more widespread, and before long every researcher had their own machine.

Over the decades, new inventions such as the microchip and the circuit board allowed computers to do more and perform more effectively. Thanks to companies such as Apple, Microsoft, HP and Dell, computers became more affordable and user-friendly, and personal computers became increasingly widespread as a result.

FROM THE INTERNET TO THE WORLD WIDE WEB

In the second half of the 20th century, many researchers developed an interest in and enthusiasm for the computer, which gave rise to a series of important discoveries. In 1961, Leonard Kleinrock (American professor of computer science, born in 1934) from the Massachusetts Institute of Technology (MIT) laid the theoretical foundations of the transmission of data between computers. Given that this discovery was made during the Cold War (1945-1990), the USA, which was always on the lookout for any advantage over the USSR, sought to make the most of this rapid form of communication.

In 1969, the ARPANET network, a forerunner of the internet, connected four computers at different locations in America which were used to manage defence projects. From four workstations in 1969, there were 111 networked computers worldwide by 1977.

In the 1980s, a software engineer at CERN (the European Organisation for Nuclear Research) in Switzerland realised that scientists were having difficulty sharing information, as they often had to log onto multiple computers to access several different pieces of information. The software engineer in question, Tim Berners-Lee (British computer scientist and physicist, born in 1955), wanted to find a solution to the problem and began working on it in his free time. He came up with the idea of centralising information which could then be easily accessed from any workstation. The first step was to create the right software: a web application called a browser, which is used to download information onto the computer and which people can use to publish and consult content online.

Before long, the first web pages became available and could be accessed easily by clicking on hyperlinks. This was the start of the World Wide Web (“www” or “W3” for short), and was followed by a period of frenzied development as the number of pages grew exponentially. The Web became increasingly chaotic and was packed with a wide range of content, which made it more and more challenging for users to navigate it.

Between 1990 and 1998, over 20 search engines, including Inktomi, AltaVista, Lycos and Excite, were created to solve this problem. They each dealt with the information online in their own way, without understanding the immensity of the world they were trying to enter, as the scope of this technology and the enthusiasm it would generate in just a few years were still impossible to imagine.

THE EARLY DAYS

TWO FATES INTERTWINED

The extraordinary story of Google, which has permanently altered our world, began with a chance encounter in the 1990s. One morning in the spring of 1995, 21-year-old Sergey Brin, a second-year computer science student, was showing a group of prospective students around Stanford University. These included 22-year-old Larry Page.

The extroverted Brin found an intellectual alter ego in the calm and reserved Page. The two young men soon found that they had much in common, but their disagreements on a wide range of complex subjects seemed to be an obstacle to their relationship developing any further.

However, when the new academic year began, Brin and Page became inseparable and were soon known for their animated conversations. Their shared interest in computing and the many possibilities that they saw in this technology provided the foundation for a solid, mutually beneficial friendship. Although they were opposites in many ways and often got into heated debates as a result, their personalities complemented each other and were the source of their partnership’s strength.

Their debates led them to identify the recurring problems they faced, to which they then tried to find solutions. The idea of building a search engine first came about during one of these animated discussions.

Larry Page.

Sergey Brin.

THE OPPORTUNITY

At university, Brin specialised in data mining, a technique for analysing vast quantities of data. He then began thinking about a way of applying this method to the Web, which was still flourishing but disorganised, in order to sort through the mass of information online.

Meanwhile, Page discovered a new search engine that he deemed more reliable than the competition. AltaVista and Yahoo! had been available since December 1995 and were already very popular. Page was intrigued. He observed that AltaVista used a new kind of link that made it possible to navigate between different pages, and discovered that the number of links to a particular page indicated its relevance and popularity. Furthermore, not all

links are created equal: the more popular a page is, the more important the links it contains are.

KEY TERMS

- **Browser:** a piece of software that allows users to access the World Wide Web.
- **Search engine:** a piece of software that allows users to find content on the Web by entering key words.

The two students then decided to work together on a project that combined their respective passions. Page studied hyperlinks, while Brin worked on extracting information from the Web. This led to the development of PageRank, an algorithm that calculates the number of links to a page to measure its relevance, and can be described as the "brain" of Google.

THE USES OF DATA MINING

In 1998, data mining was being used for a range of purposes, including understanding consumer purchasing behaviour in large stores.

THE PROJECT

In 1996, the pair's long hours of hard work in the university's computer labs paid off when they put together Backrub, a promising new search engine. It was based on a simple yet effective principle: an algorithm scanned all the pages available on the Web and automatically ranked them based on the links on the page and the links to it. A key word search gave users a list of pages (in the form of hyperlinks) ranked based on their relevance to the search terms.

In order to function, Backrub needed to store the pages it had scanned on servers. This step centralised the information, making searches easier and quicker. The World Wide Web was still in its infancy, but even so the number of pages added to it doubled each year. This meant that the search engine had to scan an ever-increasing number of sites to provide continually updated results.

In terms of equipment, it was essential to have enough servers to store a growing mass of information and to deal with the increasing number of users who were carrying out searches. Lacking the means to acquire their own servers, Brin and Page had to use servers belonging to the university.

As the weeks went by and the Web grew, their workload increased. The two young entrepreneurs were only just beginning to grasp the potential of their project. After extensive discussion, they selected Google as the official name of their search engine and registered the domain name Google.com.

A BIG NAME!

The name Google comes from the world googol, which is the number represented as one followed by 100 zeros. The name is supposed to reflect the vastness of the Web.

Shortly afterwards, in 1998, the German businessman Andy Bechtolsheim (born in 1955) injected $100 000 of funding into the project before the company was even incorporated. Bechtolsheim, who cofounded Sun Microsystems, a company specialising in the production of servers and computers, is an iconic figure in the IT world. As such, his investment sent a clear message in the sector and bolstered the project's legitimacy. One month later, the company was officially founded and Bechtolsheim's cheque could be cashed.

The same year, MSN Search, a search engine created by the internet giant Microsoft, went online. It relied on the capacities of the search engine Inktomi, and became the official homepage of Internet Explorer, Microsoft's famous web browser.

FROM THE LAB TO THE GARAGE

The pair moved from Stanford's computer labs after an acquaintance, Susan Wojcicki (American businesswoman, born in 1968) generously offered to allow them to set up their offices in her garage. The two men worked all hours, but were soon overwhelmed with work and realised that their company would develop more quickly if they brought other people on board.

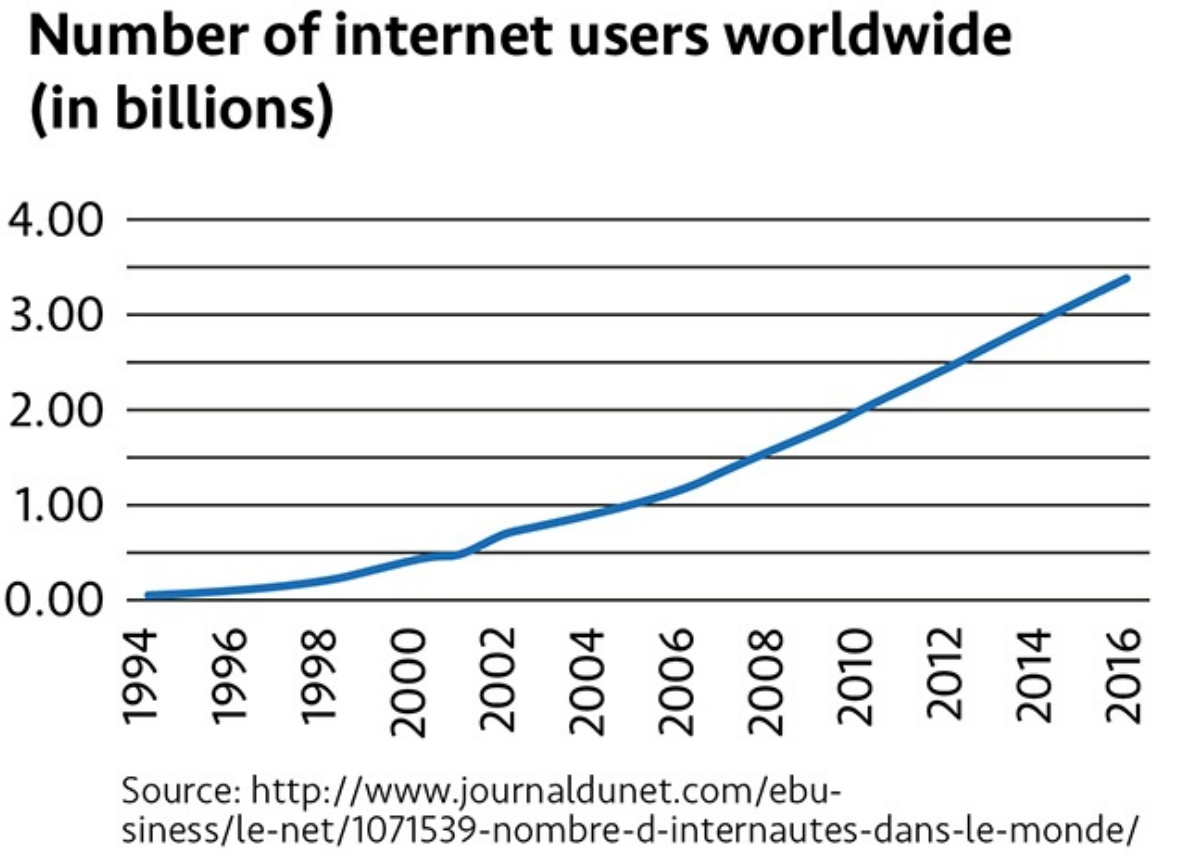
Consequently, they decided to hire one of their fellow PhD students from Stanford who shared not only their ambition, but also their outlook on the project. As the company's first employee, Craig Silverstein (born in 1972) did not have a clearly defined role: his job was to assist the two founders in carrying out day-to-day tasks.

PERSONAL CREATIONS

After leaving Stanford, the founders decided to build their own servers, and even today they still make their own equipment.

To continue running smoothly, the company needed continual and ever-larger injections of capital. To this end, the founders raised $1 million from friends and family members to support the project.

A few months later, Google was listed as one of the 100 best sites of the year by *PC Magazine*, a highly respected publication in the IT world. This was great publicity for the company, as it raised awareness of the search engine among IT and tech enthusiasts. In early 1999, Google invested in new premises in Palo Alto in Silicon Valley. By that point the company had eight employees.



GOOGLE'S EVOLUTION

AN EMOTIONAL ROLLERCOASTER

Having dusted themselves off from George Bell's rejection of their offer to sell the company in 1999, Brin and Page resolved to continue their adventure. The money raised from their friends and family almost a year earlier soon ran out, and, faced with an increasing need for funds, Google was forced to raise capital.

The venture capital firm Sequoia Capital announced its intention to finance the young company to the tune of $25 million. This money enabled Google to recruit new employees, and this workforce was vital to the project's extremely rapid development.

THE BENEFITS OF RISKY INVESTMENTS

Venture capital companies specialise in financing startups with high growth potential. In exchange for financial support, they gain shares in the company, in the hope that these will increase in value later on.

GLOBAL AMBITIONS

After its meteoric growth in the USA, Google set out to conquer the rest of the world. By May 2000, the search engine was available in ten languages, and a further 16 languages were added just a few months later.

GOOGLE AND THE CHINESE MARKET

Google is banned in China in order to allow domestic search engines to thrive. This also enables the Chinese government to control the information its citizens have access to and to gather data on internet users.

Just a few years after the company was founded, its efforts paid off and Google became the largest search engine in the world, allowing internet users to browse over one billion pages.

This expansion required enormous investment. Taking into account the popularity of the product and the opportunities offered by the market, Brin and Page began looking for quick and easy ways to raise the funds needed for their company's development.

UNUSUAL BEGINNINGS

In 2000, the company officially opened a new office in New York. The only employee based there was a sales representative, who worked from a Starbucks as they had no other premises to go to.

A few weeks later, in February 2004, Google announced its intention to go public. Almost 20 million shares were sold to the public for $85 each, with a total value of $1.67 billion. This gave Google a market value of almost $23 billion, a figure which had risen to $397 billion ten years later.

As the company now had investors to answer to, it was clear that it could not keep relying on external injections of capital indefinitely. To make Google financially viable, its founders had to find a way of monetising the considerable traffic generated by the search engine.

DEVELOPMENT OF THE COMPANY'S BUSINESS MODEL

KEY TERM

A **business model** allows users to forecast and understand the generation of added value within the company and its distribution across different areas.

In October 2000, AdWords, Google's advertising department for businesses, was officially launched. This tool allows advertisers to reach internet users based on a selection of words.

It is based on a simple principle: when a user searches for certain key words, a list of commercial advertisements related to the search appears alongside the results. The effects of this strategy are twofold: companies can target a very precise audience and analyse the results of their campaigns, and users are made aware that companies are paying to advertise their products to them. Research has shown that advertisers receive four times more visits from Google than from any other search engine when using the same advertising banner.

Brin and Page wanted to stay true to their values and act in their users' best interests, so they insisted that all advertisements should be clearly indicated as such. As a result, unlike with other search engines, users can easily distinguish between relevant results and sponsored links.

However, advertising is not the company's only source of revenue. Having seen the product's growing success, some companies opted to pay Google to include the search engine on their web pages. One such client was Yahoo!, which was yet to develop its own algorithm at this time.

With its ability to generate colossal traffic and monetise this traffic almost instantly, Google was at the forefront of a digital revolution, and it showed no signs of slowing down. The possibilities were endless, as Google had the potential to be so much more than just a search engine.

MANAGEMENT AT THE HEART OF GOOGLE'S STRATEGY

In March 2001, the American businessman Eric Schmidt (born in 1955) joined Google's board of directors as chairman. Having studied electrical engineering before earning a masters and a PhD in information technology, his years of experience had honed his ability to understand and make the most of promising new technologies. This was a valuable asset for Google's board, which was working on defining the company's overall strategy.

Five months later, Schmidt replaced Page as CEO, with Page becoming President of Products. Meanwhile, Brin became Chief Technology Officer. Schmidt's appointment enabled Google to develop and implement a clear vision that was adapted to the context the company was working in and in line with the young startup's ambitious objectives. The efforts of its founders and the experience of its CEO meant that the company was in good hands. However, as Google's leaders understood, there is more to a company's success than a good product and a clearly defined strategy.

GOOGLE'S COMPANY CULTURE: THE SOURCE OF ITS SUCCESS

As a company grows, it inevitably faces a range of organisational problems. In terms of both structure and human resources, it is vital to adopt an

appropriate strategy so that productivity and quality of service do not decline, and can even increase.

With this in mind, Brin, Page and Schmidt decided to create a work environment that encouraged innovation and placed the employee at the heart of the organisation. Their philosophy, which is primarily based on the twin pillars of the work environment and the employee, gradually developed and took root as the company expanded from the Stanford computer labs to its vast Silicon Valley premises.

Brin and Page believed that, in order to develop the best products, it is necessary to recruit the best people. It is natural for a company with a global presence to have a diverse workforce in terms of nationality, education and social background. Google takes a two-pronged approach to recruit its future star employees.

- Firstly, it needs to sift through the many spontaneous applications it receives. It does this by asking its candidates a series of unconventional questions that may seem impossible to answer, but which are primarily designed to test their thinking skills. For example, a candidate interviewing for a business analyst role may be asked to come up with an evacuation plan for the building, while other candidates have been asked about different ways of finding a needle in a haystack.
- Secondly, it pays attention to employees from other companies and may try to poach them.

The company offers its staff a wide range of services, based on the assumption that employees are more productive and perform at their best when they are happy. These include on-site amenities such as a hairdresser, massage room, gym and medical team, as well as the option of being reimbursed for dental and healthcare costs in an attempt to bolster staff loyalty. In the company’s headquarters in Zürich (Switzerland), there is even a slide to make it easier to get from one office to another.

Some of the company’s practices have generated significant buzz. These include “20% time”, which allows employees to spend 20% of their time working on projects of their choice and developing ideas that will benefit the company. This initiative proved immensely popular, and has led to the creation of many successful products.

In order to stimulate innovation, open-mindedness is essential and collaboration is encouraged. As a result, Google’s work environment is designed to encourage discussion and the exchange of ideas; for example, a

cafeteria providing, free, high-quality organic food for all employees aims to erase distinctions between the different levels of the hierarchy and bring staff together.

This philosophy and management style have boosted Google's public image and created an ideal environment to stimulate its employees' creativity, which in turn fosters innovation.

A POPULAR EMPLOYER

Google receives over 2.5 million job applications per year, or one every five minutes on average.

THE SEARCH FOR NEW MARKETS

The idea behind Google was that it is possible to make life easier for internet users by indexing and ranking all the pages on the Web. When they made the decision to place technology at the heart of their business strategy, Google's management aimed to make the most of all the opportunities in front of them. The fact that their vision was very broad in scope gave employees a great deal of freedom when it came to the creation of new products.

In the early 2000s, increasingly widespread mobile phone ownership looked set to change people's communication and internet usage habits. As can be imagined, Google's employees were intrigued by what the future held.

In 2001, Yahoo! decided to end its partnership with Inktomi and incorporate Google into its platform instead to make searching the internet easier for its users. As the leader in the phone search market, Yahoo! therefore gave Google a golden opportunity to gain a foothold in the market.

At the same time, Google was developing a range of other products to complement its search engine. These tools served to improve productivity and, in addition to attracting more and more users to Google, also allowed the company to gather valuable data.

THE FIRST EMAIL

The first email was sent in 1969, before the internet was created. The network connecting the two computers, which were hundreds of miles apart, was a forerunner of the modern internet.

In 2004, Google unveiled Gmail, its email programme that can store upwards of 500 000 emails per user. This service was created by an engineer using

20% time, and responded to complaints from users who were dissatisfied with competitors' products. Specifically, they were unhappy with other email providers' limited storage capacities and the fact that their interfaces were not very user-friendly.

Later that year, Yahoo! officially announced its intention to use its own algorithm to scan and list search results on its platform. This algorithm was made possible by the acquisition of Inktomi in 2002 and AltaVista in 2003. Similarly, Microsoft moved away from Inktomi to use its own algorithm.

In December 2005, several renowned universities joined forces with Google to make the contents of their libraries available online via the site. This was part of the Google Print project (now known as Google Books) and is in line with Google's overarching aim of making information accessible to all.

The same year, the company launched Google Earth and Google Maps, allowing internet users to see anywhere in the world from their web browser.

One year later, Google Translate, the company's instant translation service for key words, web pages and documents, was launched. Unlike other online translation services such as Bing Translator and Yahoo! Translate, which use existing software developed by third parties, Google Translate works using in-house proprietary software.

Finally, Google's success can be attributed primarily to its original algorithm, which has been honed over the years and has allowed the company to stand out from its competitors from the beginning. In addition, its wide range of products, close attention to what internet users want, management strategies and precise, effectively implemented vision all come together to make Google the market leader.

Acquisitions

The development of Google's activities is down to more than just the creativity of its employees. It regularly acquires other companies, and this practice has numerous advantages.

- It reduces costs and saves considerable time on research and development.
- The company's many acquisitions allow it to remain at the cutting edge of innovation.
- In some cases, the product has already demonstrated its effectiveness and its success is virtually guaranteed.

- This approach can hamper competitors' efforts.

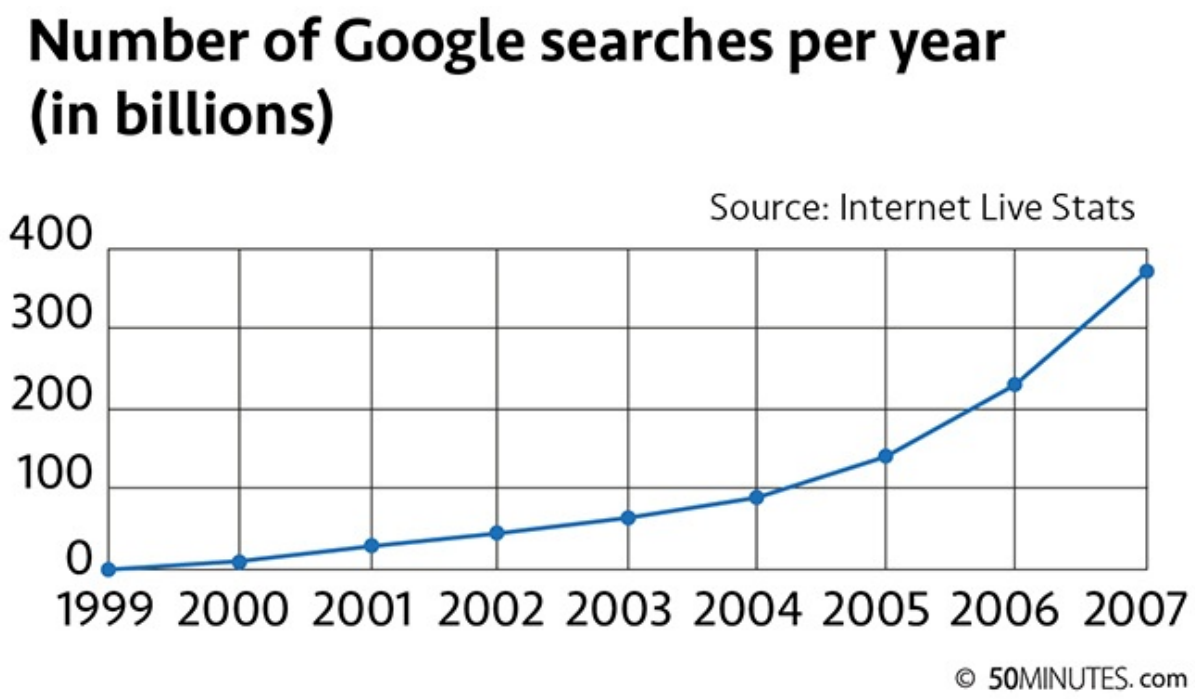
Of course, once an acquisition has been made public, Google's competitors can surmise the strategic intentions behind the decision.

As Google is one of the largest companies in the world, shelling out millions – or even billions – to acquire a company is not a problem, and entrepreneurs can become instant millionaires through these transactions. Several of Google's many acquisitions since 2001 have hit the headlines because of the huge sums of money involved: it purchased a 5% share of AOL for $1 billion in 2005 and bought YouTube, which at the time was struggling to monetise its traffic, for $1.67 billion in 2006.

At that time, YouTube was one of the websites experiencing extraordinary growth. This acquisition formed part of Google's strategy to provide varied content to the largest possible audience. Before it was purchased by Google, YouTube was unable to monetise its traffic; it now uses advertising as a source of revenue.

A changing world

Google now oversees a vast advertising empire, and in under ten years it has positioned itself as an internet giant at the forefront of a revolution that shows no signs of slowing down. Its effective strategy, model employees, foolproof business model and innovative product have played a major role in boosting internet users' comfort and productivity. In the space of just eight years, the number of Google searches carried out each year has increased by a factor of 100 000.



In a constantly changing environment, tech companies must be able to adapt. Google's success was swift and impressive, but it has also attracted a significant number of competitors who are eager to carve out their place on the market.

GOOGLE TODAY

COMPETITION, SOMETIMES AT THE EXPENSE OF INNOVATION

Google, Microsoft, Facebook and Amazon are now household names. While they initially offered very different products, their range has since expanded and they have begun to encroach on each other's territories.

In this highly competitive environment, these internet giants have become skilled at copying their rivals' products in order to tweak them and put their own spin on them.

Android

The Android mobile operating system, which aims to compete with Apple's iOS operating system, was purchased by Google in 2005 and incorporated into HTC smartphones in 2007. In January 2010, the Nexus One smartphone, which was conceived as a rival to the iPhone, went on sale. The device itself was built by manufacturers who changed every year, such as LG and Huawei, while its basic applications were all Google products (Gmail, Google Maps, Google Hangouts and, most importantly, the company's app store Google Play).

This operating system was also adapted so that it could be incorporated into Sony televisions in 2010, into tablets from a range of brands (notably Samsung) in 2011 and into smartwatches and cars in 2014.

Chrome, Chrome OS and Chromebooks

In September 2008, Chrome, Google's web browser, was officially announced. It was developed using open source material (referring to computer programming code or software with a licence that allows anybody to read, modify and redistribute it) by independent programmers who worked to continually improve it.

The following year, Google began developing its own computer operating

system, Chrome OS, which could replace Microsoft's Windows system and Apple's Mac OS. Once again, the apps provided with the system were developed by Google. A partnership with the computer manufacturers Samsung, Acer, HP and Lenovo resulted in the development of Chromebooks, the only computers with this operating system.

This strategy of imitating the competition is not without its consequences. The decision to neglect innovation in favour of aggressive competitiveness means that Google has lost some of its capacity to surprise users with revolutionary products.

GOOGLE'S FLOPS

Google's capacity for innovation and culture of creativity have propelled it to its current position as one of the top five companies in the world, but they are also responsible for some of its most disastrous failures.

One of Google's biggest flops has been its social network, Google+, which was intended to compete with Facebook. However, with some 500 million users to date, only 150 million of whom are active, it still trails Facebook's 1.5 billion users by a long way.

Another failed project is Google Glass, the company's smart headset which displays information in front of the user's eyes. The company was forced to halt tests on the product due to the backlash from consumers, who saw it as an invasion of their privacy, as users could secretly record everything they saw through the glasses.

However, Google demonstrated its ability to adapt by announcing the release of the Google Glass Enterprise Edition, designed for use in a business context. The headset has many potential uses in the professional world: for example, it can make day-to-day management quicker and more practical, as it allows users to read information while keeping both of their hands free.

Dozens of other products and services have been discontinued over the course of the past several years. These include the Google TV (intended to compete with the Apple TV), the microblogging platform Jaiku (similar to Tumblr) that the company purchased in 2007, and Google Lively (a virtual world similar to Second Life).

LEGAL TROUBLES

This decision to invest in multiple markets obviously gives Google more opportunities to strengthen its brand and increase its revenue, but it also brings more problems. This is reflected in the company's constantly expanding legal department, which currently has over 500 employees, compared with only 100 from 1998 to 2003.

Defamatory content and confidentiality policy

The majorities of lawsuits against Google come from individuals, such as people who have found defamatory content about themselves in its search engine results. Even though it is not responsible for the content it analyses and ranks, Google is nonetheless often forced to pay compensation to victims or take down the offending content.

A notable precedent was set in May 2014, when the Court of Justice of the European Union delivered its ruling on the *Google Spain SL, Google Inc. v Agencia Española de Protección de Datos, Mario Costeja González* case and officially recognised the "right to be forgotten" as a human right. Subsequently, Google was forced to implement a new procedure allowing European citizens to ask for information about them online to be taken down.

Recently, Google's intentions have been questioned and analysed by courts and governmental authorities with the aim of protecting consumers. This was prompted by allegedly unfair business practices that may infringe on citizens' rights. At present, the collection of user data, which is one of the cornerstones of the internet giants' business strategy, is proving highly controversial.

Using Google products allows the company to collect information which is then fed directly into its advertising platform. The more an individual uses Google's services, the more data it will be able to gather about them. This data is a goldmine for businesses, as it reveals everything users do online and allows them to build up a profile of each individual.

Until 2012, every Google product (Google Calendar, Gmail, Google+, YouTube, etc.) created a profile for each internet user based on their searches. In other words, if a person used 60 services, 60 unconnected profiles would be created for them. From 1 March 2012 onwards, the company made it possible to create a single profile per user, so the information from all of the 60 services could be collated. In practice, this means that if an individual searches for a particular brand of car on Google, the advertisements they see on YouTube will be more likely to feature these cars.

This did not give the company access to more data than before, but allowed it

to use it differently. This approach aimed to improve Google's understanding of each consumer and provide them with more personalised content that was adapted to their needs, but caused a stir for a number of different reasons.

First of all, it allowed Google to monitor everything its users did, whether or not this was recorded. It took several years for some countries to respond to these questionable practices, which contravened European legislation. In 2015, French and Spanish watchdogs (public agents tasked with ensuring that laws and regulations are respected) worked together to prosecute Google. The Californian company was found guilty and fined €900 000, a minuscule amount compared to its vast annual revenue (which is over 82 700 times higher than the fine!).

As well as engendering mistrust among consumers with regard to new technologies, this practice seriously threatens citizens' private lives. Centralising such a vast quantity of information is dangerous, and the consequences if it falls into the wrong hands do not bear imagining.

Intellectual property and competition law

Google's competitors' complaints are mainly related to intellectual property and competition law. For example, in 2012, the Silicon Valley software editor Oracle sued Google for almost $9 billion for copyright violation. After a bitter four-year trial, the jury ruled in favour of Google.

The company also faced legal action over its alleged abuse of dominant position through its operating systems. Specifically, Google limits consumer choice by forcing customers to use Google apps when they purchase a mobile phone with the Android operating system.

Furthermore, both the authorities and members of the general public have criticised the company for its tax avoidance arrangements in Europe and the USA. Nonetheless, it is worth mentioning that these criticisms have also been levelled at Google's fellow American internet giants Apple, Facebook and Amazon.

GOOGLE'S GLOBAL IMPACT

In spite of this bad press, Google remains a captivating organisation. Although it is a for-profit company, it still professes a desire to contribute to a better world. It made good on these claims in 2005 when it founded

Google.org, a nonprofit organisation which works to support sustainable development and fight poverty.

In November 2007, Google.org announced a project to invest hundreds of millions of dollars in the development of renewable energy sources to replace coal. The aim of the project was to reduce our dependence on fossil fuels, which were still used in vast quantities to provide electricity to run Google's millions of storage servers. At the same time, as part of a competition held for its tenth anniversary, Google invested $10 million in five projects developed by internet users to simplify everyday life.

A few months later, the organisation announced its intention to invest $14 million in companies aiming to eradicate certain disease-carrying insects. Having realised that it does not have a monopoly on good ideas or talent, Google's management team prefers to invest in promising startups rather than developing these projects in-house in order to compete with them.

GOOGLE'S LATEST INNOVATIONS

Since 2015, Google has been a subsidiary of the parent company Alphabet Inc., which comprises several sub-divisions. This removes any confusion between the search engine and the company as a whole. Alphabet Inc. is currently run by Brin (President), Page (CEO) and Schmidt (Executive Chairman).

A METEORIC RISE

After growing up poor in India, Sundar Pinchai became CEO of Google, Inc. in 2015 after rising through the ranks at the company.

During the second quarter of 2016, Alphabet Inc.'s turnover was $21.5 billion and its profit stood at $4.9 billion. Google alone generated $21.3 billion in revenue, $19.1 million of which came from advertising.

The majority of this staggering profit was reinvested in the development of revolutionary new products, including self-driving cars, virtual reality headsets, home delivery drones and balloons to provide internet access to remote areas.

In spite of the failure of Google Health (a service which stored personal health records online), which was discontinued in 2012, the company continues to invest in scientific research in the healthcare sector and hopes to

revolutionise medicine by mining individual medical data, particularly via mobile devices.

CONTINUAL PROGRESS

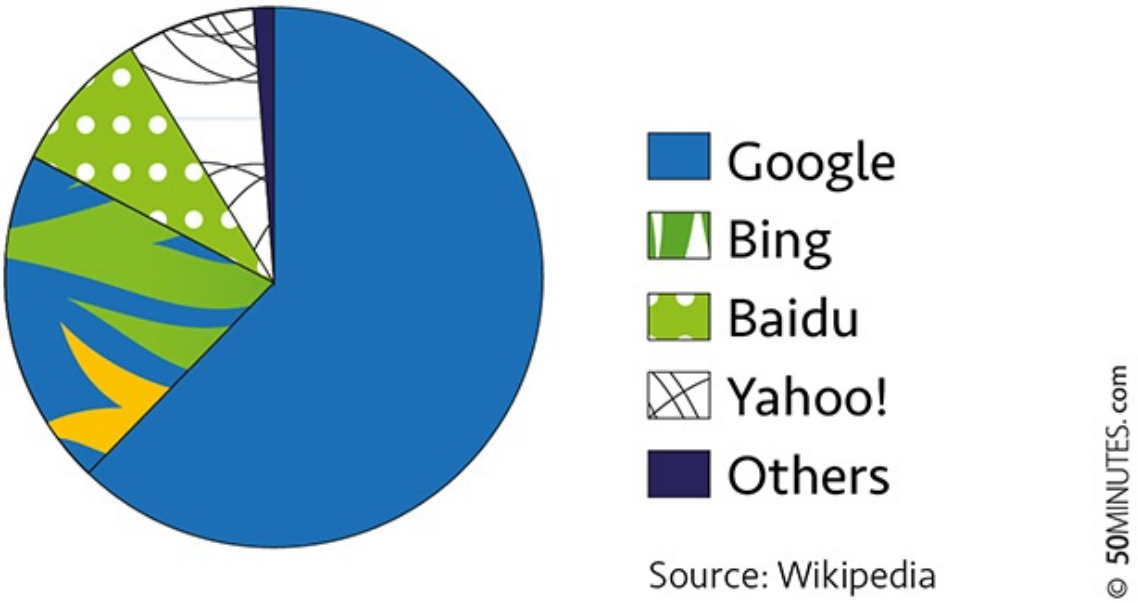
One of Alphabet Inc.'s sub-divisions is currently working on the development of artificial intelligence. Artificial intelligence can be integrated into a computer or any other electronic device, allowing it to learn and evolve. Although most people are unaware of it, this technology already makes our day-to-day lives easier: it is thanks to artificial intelligence that web mapping services are increasingly effective and our smartphones can respond to voice commands.

In 2015, Google's business model was called into question when the Amazon Echo went on general sale in the USA. This smart speaker can be used to control electronic devices such as mobile phones and carry out the user's commands. In particular, it can read out the results of an internet search, read an audiobook and play music on demand, and it raises the possibility of screens becoming obsolete in the near future.

However, Google relies on sponsored links, which account for over 90% of its revenue. In 2016, the company launched its own brand of smart speakers, called Google Home. It is clear that the company is working on a way to monetise searches carried out by an intelligent personal assistant. Indeed, Google's leaders have shown on several occasions in the past that they have a knack for correctly identifying the threats facing their company and turning them into opportunities.

AltaVista, which captured Page's attention in the Stanford University computer labs, was shut down in 2013 and now redirects to the Yahoo! homepage. MSN search became Windows Live Search and then Bing, and is now one of the world's top five search engines, though it is still far behind Google. Excite was acquired by Ask Jeeves (now Ask.com) in 2004, but its popularity pales in comparison to sites like Google, Bing and Yahoo!

Google's phenomenal success since 1998 can be illustrated by the fact that, if George Bell had invested a dollar in the company when Brin and Page went to see him 18 years ago, he would now have a cool $559 000 in Google shares.



For 17 years and counting, Google has led the way in web searches, and is the preferred search engine of both companies and individuals. However, its story is far from over, and we can be sure that it still has plenty of surprises in store.

SUMMARY

- The development of the computer in the second half of the 20th century allowed scientists to lay the foundations of the modern internet. This network encouraged the proliferation of online content, forming the World Wide Web, and the distribution of this content. Search engines aimed to organise this vast amount of information.
- Sergey Brin and Larry Page, two Stanford PhD students, developed a revolutionary algorithm that made their search engine more effective than those of their competitors. They worked on the project together and decided to turn it into a real company.
- After positive results with users, the two friends planned to sell their company to make money. When their offer was turned down, they decided to keep working on the project themselves. When their money started running out, they secured $25 million in funding from a venture capital firm.
- Google's IPO was a resounding success and its share prices soared. The company was then flush with money and seemed to have a promising future ahead of it.
- Google then looked for ways to monetise its search engine's considerable traffic. The company began allowing advertisers to pay for sponsored links on its results page.
- Google's relaxed, talent-focused corporate culture allowed it to attract gifted employees and foster innovation.
- To maintain its leading position in increasingly competitive markets, Google does not hesitate to copy its rivals' flagship products, resulting in an eye-wateringly expensive turf war.
- The company has been criticised not only by competitors and private users, but also by governments, who have even been known to take Google to court. In particular, users' right to retain control of their personal data online has proved a thorny subject.
- Google is trying to strengthen its image by investing in various charitable and research activities, sometimes in sectors that are largely unrelated to the internet, such as healthcare.
- Today, Brin and Page are focusing on developing revolutionary new projects, much as they did almost 20 years ago. With a market

capitalisation of almost $560 billion, all signs suggest that the company has a bright future ahead of it.

We want to hear from you!
Leave a comment on your online library
and share your favourite books on social media!

FURTHER READING

BIBLIOGRAPHY

- Abbate, J. E. (1994) *From ARPANET to Internet: A history of ARPA-sponsored computer networks, 1966-1988*. PhD. University of Pennsylvania.
- Abboud, L. (2015) Google To Change Its Privacy Policy. *Huffington Post*. [Online]. [Accessed 8 November 2017]. Available from: <https://www.huffingtonpost.com/2015/01/30/google-privacy-policy_n_6577948.html>
- AFP. (2016) Alphabet/Google profit jumps 43% to $4.9 bn. *Phys.org*. [Online]. [Accessed 9 November 2017]. Available from: <https://phys.org/news/2016-07-alphabetgoogle-profit-bn.html>
- Auffray, C. (2017) Chiffres clés : les OS pour smartphones. *ZDNet*. [Online]. [Accessed 8 November 2017]. Available from: <http://www.zdnet.fr/actualites/chiffres-cles-les-os-pour-smartphones-39790245.htm>
- Auletta, K. (2010) *Googled: The End of the World As We Know It*. New York: Random House.
- Bhartiya, S. (2016) Amazon Echo vs. Google Home: The choice is obvious. *CIO*. [Online]. [Accessed 8 November 2017]. Available from: <https://www.cio.com/article/3143137/open-source-tools/amazon-echo-vs-google-home-the-choice-is-obvious.html>
- Bilton, N. (2013) AltaVista. What's That? *The New York Times*. [Online]. [Accessed 9 November 2017]. Available from: <https://bits.blogs.nytimes.com/2013/07/01/altavista-whats-that/>
- Brandt, R. L. (2011) *The Google Guys: Inside the Brilliant Minds of Google Founders Larry Page and Sergey Brin*. London: Penguin.
- Brin, S. (1998) Extracting Patterns and Relations from the World Wide Web. *The World Wide Web and Databases*. Berlin: Springer, pp. 172-183.
- Brin, S. et al. (1998) What Can You Do With a Web In Your Pocket? *IEEE Data Enfg.Bull*. 21(2), pp. 37-47.
- Bulygo, Z. (No date) Inside Google's Culture of Success and Employee Happiness. *Kissmetrics Blog*. [Online]. [Accessed

8 November 2017]. Available from: <https://blog.kissmetrics.com/googles-culture-of-success/>
- Cain Miller, C. (2013) Google Introduces a Touch-Screen Laptop. *The New York Times*. [Online]. [Accessed 8 November 2017]. Available from: <https://bits.blogs.nytimes.com/2013/02/21/google-introduces-a-touchscreen-laptop/?_r=0>
- Carlson, N. (2014) A List Of Products Larry Page Has Google Working On Other Than Search, Such As Spoons. *Business Insider*. [Online]. [Accessed 8 November 2017]. Available from: <http://www.businessinsider.com/a-list-of-google-products-2014-9?IR=T>
- CBInsights. (No date) *The Google Acquisition Tracker*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.cbinsights.com/research-google-acquisitions>
- CERN. (No date) *The birth of the web*. [Online]. [Accessed 9 November 2017]. Available from: <https://home.cern/topics/birth-web>
- Computer History Museum. (No date) *Timeline of Computer History*. [Online]. [Accessed 9 November 2017]. Available from: <http://www.computerhistory.org/timeline/1937/>
- Cowley, S. (2012) How Four Companies Took Over the Internet. *CNN*. [Online]. [Accessed 9 November 2017]. Available from: <http://money.cnn.com/2012/11/12/technology/techonomy-big-four/>
- D'Onfro, J. (2015) The truth about Google's famous '20% time' policy. *Business Insider*. [Online]. [Accessed 9 November 2017]. Available from: <http://uk.businessinsider.com/google-20-percent-time-policy-2015-4?r=US&IR=T>
- Geiger, A. (2012) Google's never-ending legal problems. *The Hill*. [Online]. [Accessed 9 November 2017]. Available from: <http://thehill.com/blogs/congress-blog/technology/226461-googles-never-ending-legal-problems>
- Goel, V. (2016) When Yahoo Ruled the Valley: Stories of the Original 'Surfers'. *The New York Times*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.nytimes.com/2016/07/17/technology/when-yahoo-ruled-the-valley-stories-of-the-original-surfers.html>
- Google.com (No date) *About*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.google.com/about/>
- GooglePress. (No date) *News announcements*. [Online]. [Accessed 9 November 2017]. Available from: <http://googlepress.blogspot.be/>

- Harding, X. (2016) Google Has 7 Products With 1 Billion Users. *Popular Science*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.popsci.com/google-has-7-products-with-1-billion-users>
- HistoryofInformation.com. (No date) *The Most Famous Image in the Early History of Computing*. [Online]. [Accessed 9 November 2017]. Available from: <http://www.historyofinformation.com/expanded.php?id=2245>
- Internet Live Statistics. (No date) *Google Search Statistics*. [Online]. [Accessed 9 November 2017]. Available from: <http://www.internetlivestats.com/google-search-statistics/>
- Internet World Stats. (No date) *Internet Growth Statistics*. [Online]. [Accessed 9 November 2017]. Available from: <http://www.internetworldstats.com/emarketing.htm>
- Investopedia. (No date) *Who are Google's (GOOG) main competitors?* [Online]. [Accessed 9 November 2017]. Available from: <https://www.investopedia.com/ask/answers/120314/who-are-googles-goog-main-competitors.asp>
- Jansen, B., Spink, A. and Saracevic, T. (2000) Real Life, Real Users and Real Needs: A Study and Analysis of User Queries on the Web. *Information Processing and Management*. 36(2), pp. 207-227.
- *Judgment of the Court of Justice (Grand Chamber) of the European Union of 13 May 2014 in Case C-131/12*. [Online]. [Accessed 9 November 2017]. Available from: <http://curia.europa.eu/juris/document/document.jsf?text=&docid=152065&pageIndex=0&doclang=EN&mode=lst&dir=&
- Lazuly, P. (2003) Le monde selon Google. *Le Monde Diplomatique*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.monde-diplomatique.fr/2003/10/LAZULY/10471>
- Marquez, E. (2011) Android 2.3.6 est en cours d'envoi sur les Nexus S. *FrAndroid*. [Online]. [Accessed 9 November 2017]. Available from: <http://www.frandroid.com/actualites-generales/79137_android-2-3-6-est-en-cours-denvoi-sur-les-nexus-s>
- Mounier-Kuhn, P. (No date) Machine Analytique de Babbage. *Universalis.fr*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.universalis.fr/encyclopedie/machine-analytique-de-babbage/>
- Moynihan, T. (2014) Google announces Android Auto, its answer to Apple's Carplay. *Wired*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.wired.com/2014/06/android-auto/>

- Othnin-Girard, F. (2013) Google : Tout ce qu'il faut savoir sur son histoire. *Histoires de web*. [Online]. [Accessed 9 November 2017]. Available from: <http://histoiresdeweb.fr/google-histoire/>
- Page, L., Brin, S., Motwani, R. and Winograd, T. (1999) The PageRank Citation Ranking: Bringing Order to the Web. *Stanford InfoLab*. [Online]. [Accessed 9 November 2017]. Available from: <http://ilpubs.stanford.edu:8090/422/>
- PakWired. (2015) *Noticeable Lawsuits Against Google*. [Online]. [Accessed 9 November 2017]. Available from: <https://pakwired.com/noticeable-lawsuits-against-google/>
- Paul, I. (2013) Hewlett-Packard joins Chromebook fray with 14-inch browser-based laptop. *PCWorld*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.pcworld.com/article/2027033/hewlett-packard-joins-chromebook-fray-with-14-inch-browser-based-laptop.html>
- Paul, I. (2012) Google's New Privacy Policy: Why You Should Care. *PCWorld*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.pcworld.com/article/248715/googles_tracking_plan_offe
- Profis, S. (2012) Five ways Google's unified privacy policy affects you. *CNet*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.cnet.com/how-to/five-ways-googles-unified-privacy-policy-affects-you/>
- Securities and Exchange Commission. (2004) *Form S-1 Registration Statement*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.sec.gov/Archives/edgar/data/1288776/000119312504073
- Siegler, M.G. (2010) When Google Wanted To Sell To Excite For Under $1 Million – And They Passed. *TechCrunch*. [Online]. [Accessed 9 November 2017]. Available from: <https://techcrunch.com/2010/09/29/google-excite/>
- Statistic Brain. (No date) *Google Annual Search Statistics*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.statisticbrain.com/google-searches/>
- Sullivan, D. (2013) A Eulogy For AltaVista, The Google Of Its Time. *Search Engine Land*. [Online]. [Accessed 9 November 2017]. Available from: <https://searchengineland.com/altavista-eulogy-165366>
- Thoppil, D. A. (2013) Who Is Google Android's Sundar Pichai? *The Wall Street Journal*. [Online]. [Accessed 9 November 2017]. Available from: <https://blogs.wsj.com/indiarealtime/2013/03/14/who-is-google-androids-sundar-pichai/>

- Tikka, J-P. (2009) The Greatest Internet Pioneers You Never Heard Of: The Story of Erwise and Four Finns Who Showed the Way to the Web Browser. *Xconomy*. [Online]. [Accessed 9 November 2017]. Available from: <https://www.xconomy.com/national/2009/03/03/the-greatest-internet-pioneers-you-never-heard-of-the-story-of-erwise-and-four-finns-who-showed-the-way-to-the-web-browser/>
- Thompson, A. (2017) Google's Vision Statement & Mission Statement. *Panmore Institute*. [Online]. [Accessed 9 November 2017]. Available from: <http://panmore.com/google-vision-statement-mission-statement>
- Vise, D. (2007) The Google Story. *Strategic Direction*. 23(10).
- World Wide Web Foundation. (No date) *History of the Web*. [Online]. [Accessed 9 November 2017]. Available from: <https://webfoundation.org/about/vision/history-of-the-web/>

ADDITIONAL SOURCES

- Cassin, B. (2017) *Google Me: One-Click Democracy*. Trans. Syrotinski, M. New York: Fordham University Press.
- Girard, B. (2009) *The Google Way: How One Company Is Revolutionizing Management As We Know It*. Trans. Brown, E. San Francisco: No Start Press.
- Schmidt, E. and Rosenberg, J. (2015) *How Google Works*. London: John Murray.

DOCUMENTARY

- *Google and the World Brain*. (2013) [Documentary]. Ben Lewis. Dir. UK/Spain/Germany: BBC, Polar Start Films, Arte.

ICONOGRAPHIC SOURCES

- Larry Page. © Jakub Mosur.
- Sergey Brin. © Steve Jurvetson.

www.50minutes.com

Ebook EAN: 9782808005791

Paperback EAN: 9782808006491

Legal Deposit: D/2017/12603/879

Cover: © Primento

Digital conception by Primento, the digital partner of publishers.