

The Google Story

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This book is about how Google was born and how it has grown. It provides a fascinating account of how great, brilliant minds work. In this case we are referring to the minds of Google founders, Sergey Brin and Larry Page. It also gives insights into the Silicon Valley culture, how venture capitalists and lawyers work and how the university system nurtures talent and innovation.

Introduction

Google, the popular search engine, has empowered individuals and transformed the way we access information in a manner that would have been unthinkable ten years ago. People “Google” everyday. Life today for most people, especially youngsters, would be unimaginable without Google. Google’s appeal extends across cultures and countries. The search engine’s universal popularity is the result of word-of-mouth, not high profile advertising.

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Google’s best kept secret is its expertise in handling computer hardware. Google’s employees assemble and customize all the PCs that the company uses to carry out searches. Google turns inexpensive PCs into computing powerhouses by integrating and stringing them together with patented software and wiring. These customized computers rapidly carry out searches by breaking queries down into tiny parts. These parts are processed simultaneously by comparing them to copies of the Internet that have been indexed and organized in advance. In short, there is no comparable computer network or database in the public or private sector, anywhere in the world.

Developing a search engine

Brin and Page had early exposure to computers thanks to their highly educated parents, who were comfortable with computers and sophisticated mathematics. As the authors mention, “Scholarship was not just mentioned in their homes, it was treasured.” Education in Montessori schools and proximity of their homes to major universities played a crucial role in shaping the careers of Brin and Page.

The two met in Stanford where they registered for a PhD. Encouraged by their advisor, Rajeev Motwani, a young 30 year old professor, the two became excited about finding ways to locate and extract information from large amounts of data. Locating something on the emerging disorganized Internet in the mid-1990s, was not easy.

While studying Alta Vista, a popular search engine of the times, Page noticed that the search result included something called links. Page decided to dig into links and see how they might be used further. He had a hunch that the number of links pointing to a website was a way of ranking that popularity. But all links were not created equal. The sites with most links pointing to them were clearly the most important. This led to the concept of Page Rank. While other search engines relied on matching words in queries with words on web pages, Page Rank provided an extra dimension. It put search results in a logical order for users.

When, the search engine was made available to students, faculty and administrators in Stanford, its clean uncluttered look received a lot of appreciation. As the database and number of users grew, Brin and Page needed new computers. With little cash with them, they bought parts, built their own machines and moved around the loading dock in Stanford, looking for unclaimed computers. The duo's PhD advisors provided them \$10,000 from the Stanford Digital libraries project. Page's dorm room effectively became a data centre.

The Google search engine took more factors into account than any other search engine on the market. It did not just count words or links and deliver results. It combined information about words and links with other variables in new and interesting ways that produced better search results. The search engine was sufficiently intelligent to realize that it did matter whether words or phrases on web pages were close together or far apart, what their font size was, whether they were capitalized or in lower case type.

Google's founders also realized that their search engine needed greater computing power than that of any other search engine then available. Both hardware and software were important and had to be carefully intertwined and optimized. Brin and Page focused on the right mathematical equations and multiple personal computers to create a modern assemble line to gather, index and present information. Page explained to a group the modus operandi, "We crawl the web which means we go out and download the entire web. We download roughly 100 pages per second. This is fairly complicated to do reliably. We actually store all the web pages we download because it is very good for research. We have the web on disks across the hall. It promises to be very useful to have research to have this around."

As they scaled up operations, funding became crucial. The first break for Brin and Page came when angel investor Andy Bechtolsheim wrote a cheque for \$100,000 after making a remark: "This is the single best idea I have heard in years. I want to be part of this." Brin and Page decided to take a leave of absence from the PhD program to focus

on the business full time. The \$100,000 cheque signaled the credibility of the project. Thanks to contributions from close friends, the kitty swelled quickly to \$ 1,000,000.

On June 7, 1999, less than one year after they took leave from Stanford, Brin and Page announced that two leading Silicon Valley venture capitalists, Kleiner Perkins and Sequoia capital had, as equal partners, together agreed to invest \$25 million in Google. The founders had successfully structured the deal without giving away control and power.

Gradually, the vision of Google crystallized. Brin and Page challenged the prevailing conventional wisdom that all purpose websites would be the preferred gateway to the Internet. As specialization increased, Google's founders felt these sites would fail to meet particular or specialized needs. The two were convinced that search was the most important long term problem to be addressed. They had complete clarity about becoming dominant in search, just at the time when others were abandoning it and calling it a commodity.

Managing talent

Page and Brin realized the need to attract talent. They sold Google to prospective recruits on the basis of cool technology, stock options, free snacks and drinks. The company's vision of developing software that would make an impact on millions of people, was also very appealing.

During the dotcom crash of 2000, Google went on a hiring spree even as other companies retrenched heavily. Google found it had access to outstanding software engineers and mathematicians who suddenly found themselves unemployed, holding on to a pile of worthless stock options. Even as competitors struggled, Google moved to a larger headquarters in Mountain View.

Google continued its efforts to maintain a congenial environment where talent could flourish. Employees enjoyed free meals, juices, snacks, on site laundry, hair styling dental and medical care, car wash, fitness facilities with personal trainers and even a professional masseuse. Buses in which employees commuted between home and office were equipped with wireless Internet access. This ensured that employees, worked on their way to office and reached office without tension/frustration.

Revenue model

By the end of 1999, Google was averaging 7 million searches per day but its revenues were small. Google depended mostly on licensing deals. Advertisements were a potential source of revenue but Page and Brin realized that ad funded search engines invariably became biased towards advertisers. They decided to follow a new revenue

model. While search results would remain free, Google would make money by selling unobtrusive, targeted advertising to businesses on the results pages.

Google decided to maintain a clear distinction between search results and ads. The company also decided to keep the home page free of ads. To maintain a high quality of user experience, Google decided against any pop ups or graphics. The ads would be brief, look identical, just a headline, a link and a short description. Advertisers could sign up online themselves. Instead of displaying an ad from the vendor willing to pay the most, Google renewed its ads based on a formula that took into account both how much someone offered to pay and how frequently computer users clicked on the ad. In short, Google trusted users to rank the ads. Consumer pull rather than business push determined where ads appeared.

Google's popularity continued to expand due to word of mouth. It became available in various languages. Google persuaded other websites to add a Google search box. On June 26, 2000, Google signed an agreement with Yahoo to provide the portal with Google generated search results. This agreement significantly expanded Google's presence on the web.

In June 2000, Google announced it had become the world's largest search engine with more than one billion pages in its index of websites. Performing 100 million searches per day, its activities continued to expand. One engineer found a way for searchers to find a phone number on Google by simple entering someone's name and zip code into the search box. Another came with a way to take care of spelling errors. If a person typed in one of the words incorrectly, the search engine automatically asked, "Did you mean xxx?" Google also launched Image Search, a service that included millions of photographs and other graphics. This facility showed that the Google search model had major expansion opportunities. As the business expanded, for the first time in its history, Google earned an annual profit of \$7 million.

Google attained new financial heights in 2002. America online accepted Google as its search engine of choice on May 1. Winning the AOL business against Inktomi, which provided search results, and Overture which provided search related ads had not been easy for Google. Google provided a large financial guarantee running to millions of dollars to swing the deal in its own favour. Here Brin and Page had their say and were more willing to take more risk than CEO Eric Schmidt.

Google made money every time a computer user clicked on one of the ads it displayed. But instead of fixing in advance, the cost of running an ad, on Google and its affiliated sites, was determined in a nonstop online auction. Google operated a sophisticated 24 hour market place where thousands of words and phrases that people searched for everyday were bought and sold like goods and services.

In 2002, Google generated sales of \$440 million and profits of \$100 million. Virtually, all the profits were generated from people clicking ads on the right side of the search results pages and the pages of partners and affiliates. Google fully leveraged the “network” effect. The more computer users who clicked on the Google ads, the more money website owners made. The more money they made, the more other sites were willing and eager to add Google search and ad technology to their offerings. The bigger the network grew, the harder it became for everyone to challenge it. In short, Google rapidly emerged as the #1 destination for displaying ads online.

The Google IPO

The Google IPO became a story by itself. Google’s founders relished their autonomy and independent thinking and put off the idea of an IPO for as long as they could. But by early 2004, the pressure for an IPO was mounting. For many Silicon valley entrepreneurs, an IPO was the ultimate dream. But for Brin and Page, it was just the opposite. They loved the privacy and the freedom and did not want to disclose more than what was necessary to analysts.

But realizing that the IPO was inevitable, they decided to do it in a typical Google way. They placed their trust more in mathematical equations, software and technology than they did in Wall Street advisors. In its statement filed with SEC, Google outlined an entirely different method of distributing stock to the people, based on Dutch auctions. Google decided to sell its stock based on bids received online from potential investors. Anyone who made a bid at a level at or above the clearing price set by the company, was allotted stock. Google decided to set a maximum and minimum price and invite people to bid within that range. Novices and ordinary investors who were prepared to buy even 5 shares, were eligible to participate.

The founders decided to compensate Wall Street at less than half the usual fees. Wall Street firms who wanted to handle the IPO had to sign confidentiality arguments at every meeting. The company revealed as little about its financials and operations as possible to investment bankers. Google decided not to do road shows to meet people behind closed doors – the institutional investors and heavyweights of Wall Street. Google’s founders did not want to give these big guns any special advantage compared to ordinary investors. So they decided to give everyone access to the same additional data about Google by posting it on the Internet.

A letter from Brin and Page accompanying the disclosure of the company’s financial and operational details began, “Google is not a conventional company. We do not intend to become one.” The founders wanted to convey that Google had personality and wanted to capture the world’s attention regarding the company’s culture and work environment. They described their motto as: “Don’t be evil.” The founders also hoped that the company’s prosperity and ingenuity would be applied to solving major world problems.

The IPO got into a tangle when Geico, an automobile insurer filed a lawsuit against the search engine for trademark infringement. The SEC launched a probe into Google's internal procedures. Google appeared to have issued enormous quantities of stock and options without registering the shares or revealing its financial results to its private employee shareholders. Apparently, Brin and Page did not want employees to know about the company's financials for fear that it might leak out to competitors. Soon many analysts wanted Google to postpone its IPO. But Page and Brin found the IPO process to be enormously time consuming and a wasteful distraction from the search engine. The sooner it was over, the sooner things would return to normal.

Fortunately, all these problems were resolved and the Google IPO went out at \$85 per share on NASDAQ on August 19, 2004. When trading began, the stock jumped with the price crossing \$100. The IPO raised \$1.67 billion for Google.

It was not just during the IPO that Google's founders displayed their deal making skills. Flying to Spain in the fall of 2004, Brin and Page heard that Yahoo had beaten Google in a competition to be the exclusive provider of ads for AOL's European Internet service. Yahoo had offered more money and better terms. Brin and Page sprang into action and diverted the private jet to London. They decided to make a revised offer that AOL could not refuse. In winning the deal, the two demonstrated that they could be hands – on managers and aggressive businessmen.

A culture of innovation

Google software engineers spent at least 20% of their time working on whatever projects interested them. This helped Google to come up with breakthrough ideas. Google News enabled people to access news items effortlessly. Google Alerts was developed as an automatic way for people to track specific topics of interest by email. Alerts helped people to keep track of a particular company, issue, individual or a subject in the news.

Another service, Froogle enabled people to locate items they wanted to purchase and collect information about comparative products and prices. Rhyming with Google, Froogle conveyed the keen desire of consumers to hunt for value.

Page and Brin wanted to make a big splash with their email service Gmail. The founders realized it had to be radically better than the email services already on offer. They decided to give away one free gigabyte of storage on Google's own network with each Gmail account. Gmail also enabled people to find emails instantly, without having to think about storing or sorting them. A Gmail search was as fast and accurate as Google search. Unlike the search engine, Gmail was designed to make money even during the test phase. Page and Brin hit upon the idea of putting small ads on the right side of Gmail that were contextually relevant, i.e., triggered by words contained in the emails.

Initially, politicians and privacy groups attacked the company and its plans. Gradually, the uproar subsided.

In October 2004, Google launched desktop search, a fast, free, easy way for people to find information of all kinds stored in their own computers as quickly as they could search the Internet. This innovation closed the gap between the accuracy and speed of search on the Internet and that on PCs. Google described Desktop as a “photographic memory for your computer.” Google Desktop embarrassed Microsoft by enabling millions of computer users to find misplaced files stored using Microsoft’s programs. There was also no need to store files into folders and directories. Google also launched a product Mini that could search up to 100,000 internal documents. Mini was meant for small and medium businesses.

Google also released satellite mapping and navigation services, ways for users to save personal search histories, Google Suggest was a way for the search engine to propose search topics. Google Scholar, a new product helped to locate scientific and academic articles. Google also released quick new ways for computer users to search for stock quotes, taxis and weather conditions. Google Earth enabled computer users to visually fly to any place on the earth with 3 D views along the way. Google also added a way to explore the surface of the moon through moon.google.com.

An ambitious project

A new project, digitization of books in major libraries, was clearly Google’s most ambitious project. Page and Brin announced they were prepared to devote significant amounts of money and resources to digitizing millions of books that were gathering dust or growing old and brittle in famous libraries all over the world. Five big names, University of Michigan, Stanford, Harvard, Oxford and New York Public library signed up. Google won over the publishers arguing that they would find new opportunities to sell books. Google would cover the costs of scanning and indexing books for the right to display them as part of search results. Google would display only the few selected pages or snippets of text that related to the user’s query and in a form that could not be copied or printed. Google believed all this could give readers a taste of the book and entice them into purchasing a copy. Most of the major publishers signed on to Google Print. Google hoped to have 50 million complete books in its database when the scanning was finished, in about a decade. In comparison when it was launched in 1998, Google had an index of 25 million web pages.

New Challenges

Google generated billions of dollars annually from click based advertising. Ironically, click fraud remained the most significant threat to Google’s business model. Click fraud manifested itself in two ways; businesses clicking away on the text ads of competitors in order to raise their marketing costs or website publishers who were part of Google’s

affiliate network repeatedly clicking on ads served to their own sites in order to pocket more revenue. Click fraud involved automated or manual clicks that did not generate business leads. It cost advertisers money and exposed a vulnerability in Google's cost per click advertising model. Google continued its efforts to develop software that filtered out fraudulent clicks before advertisers got billed for them. But the market perception seemed to be that Google was less customer responsive than Yahoo in dealing with the problem. Also, with its bargaining power and dependence on these revenues, Google, in spite of having the data, did not seem to have the incentive to fight click fraud. Google's selection of partners also came for criticism. The search engine allowed new websites to sign up in a few minutes online whereas Yahoo reviewed each new site manually. So Google seemed to be lacking in necessary controls to prevent websites from signing up merely to generate ad revenue through self clicking.

Many analysts worried that Google earned all of its money from a single source, i.e., Internet advertising tied to searches. But Schmidt told analysts in early 2005, "We have a wonderfully diverse set of advertisers. We are not reliant on any particular category or advertiser to some overwhelming regard. Part of it is because of this concept called "the long tail." What Schmidt meant was that the most popular books, made up a surprisingly modest portion of sales for retailers like Amazon. The rest came from a long tail of obscure favorites that the Internet had made easier to find. Schmidt mentioned: "The surprising thing about the long tail is how long the long part of the tail really is and how many small businesses there are that have not had access to the mass market." Schmidt remained confident that Google's business model had plenty of room for growth.

The road ahead

Can Google overthrow Microsoft and emerge as the leading software company in the world? Google is still small compared to Microsoft but the company seems to have the wind behind it. Gates had admitted once in an interview: "Google is interesting not just because of web search but because they are going to try to take that and use it to get into other parts of software. If all there was search, you really shouldn't care so much about it. It is because they are a software company. In that sense, they are more like us than anyone else we have ever competed with." When Gates saw on the Google website, similar job openings as in Microsoft, he realized it might be going far beyond a search war. An email from Gates to his senior executives reflected this apprehension: "We have to watch these guys. It looks like they are building something to compete with us."

Meanwhile, the scalability of Google's business model continues to look promising. The company can sign up new advertisers almost entirely through self service over the Internet. This cuts costs, increases revenue and expands opportunities for everyone involved. Google also has an extraordinary brand awareness. No other company has

achieved this kind of global recognition without spending heavily on advertising and marketing.

Meanwhile, Wall Street analysts are perplexed by the company's unconventional methods. The company has shrouded itself in secrecy and does not believe in giving analysts any guidance about future products and quarterly profit. The Google founders remain adamant about not giving out any information that can offer competitors clues about its future strategy.

Even as Google addresses these challenges, new vistas continue to open up. Google has set its eyes on fields like biology and genetics. Google's stated goal is to help millions of people gain access to information that will lead to healthier and smarter living through the prevention and cure of a wide range of diseases. As Brin mentions, "Too few people in computer science are aware of some of the informational challenges in biology and their implications for the world. We can store an incredible amount of data very cheaply." Google wants to accelerate the emergence of personalized medicine in which understanding an individual's precise genetic make up can enable physicians to offer tailored health treatment. Google has plans to build a genetic database, analyse it and find meaningful correlations for individuals and populations.

Google is also experimenting with various artificial intelligence techniques and new methods of language translation. Google would also like to do more for entrepreneurship, self-reliance and philanthropy, Google would like to contribute to the production of clean, affordable fuel that does not harm the environment. Nothing seems to be out of Google's reach as Brin's remark at the end of the book would seem to suggest: "Perhaps in the future, we can attach a little version of Google that you just plug into your brain."