The Search Study Guide

The Search by John Battelle

BOOKRAGS

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Plot Summary

Searching the Web is a commonplace activity for those who use the Web. Without the ability to search, the Web would likely be a smaller and less useful place. As Internet businesses grow, the competition to have high rankings in search engines becomes a consulting business in its own right, where Web pages are optimized with SEO (Search Engine Optimization) techniques. This is all driven by the desire to increase a Web site's traffic, which in the Internet business world translates directly into more sales.

Larry Page and Sergey Brin carry out search development centered on a unique approach to ranking pages by relevance. This development leads to creating a search engine and a company called Google. The first few years of Google's life involve further development, but a business plan needs to be created that brings in revenue. The pay-per-click business model that Bill Gross first develops proves to be successful, and Google takes off on a rapid growth path. A somewhat messy IPO period ensues with a good deal of criticism from the press. Meanwhile, other search companies, especially Yahoo, take a different technical approach to search, and their businesses grow. Still, none can match the expansion of Google into the marketplace. Eventually, the Google IPO goes through, and investors make millions of dollars in just a few months.

Search has its downside as well. Information that is normally difficult to research is brought to the Web and added to search indexes. Anything on the Web that is not specifically shut off from search will become part of the indexes. Depending on what information is on the Web, individuals might be shown in a poor light when others do searches on their names. Rectifying this situation now involves lawsuits, although recent legislative efforts might control access to personal information better in the future. The risk is also high that the government might abuse information returned in search results.

The upside is that search brings us more relevant results, and since new devices - not just your computer - may access the Web, search has the potential of making life easier. The author envisions a Database of Intentions, an integral part of determining a searcher's intent while clicking through the Web. Searchers leave click trails that show where they have been and what they have looked for. These can be included in the Database. If the user's intent can be determined, then marketing efforts that follow the user around the Web will have greater chances of generating sales.

Chapter 1, The Database of Intentions

Chapter 1, The Database of Intentions Summary

The author envisions a Database of Intentions, where Internet search companies, Google in particular, build databases of popular search terms and analyze the data to determine what people want. After the terrorist attacks in 2001, the top popular search terms, as listed on Google's Zeitgeist page, were Nostradamus, CNN, World Trade Center and anthrax, reflecting a general trend change in the American culture. This kind of information can be used to determine what people are buying, planning to buy or avoiding, and the information can be sold to clients as marketing research. Additionally, doctorate candidates in cultural anthropology, psychology, history and sociology will likely find the Database to be a valuable research tool.

The CEO of Google, Eric Schmidt, initially disagrees with the author. He says that Google is looking for the next billion-dollar technology market, not something that can be considered part of the information media. A year later, Schmidt agrees with the idea. This is because Google and its competitors discover that paid search, where clients pay for higher rankings in search results, is very profitable. "In less than five years, the business [Google] has grown from next to nothing to over $4 billion in revenue . . ." (p. 4). Internet search is now a common way to use a computer connected to the Web. Most people know how to respond to a search box, and this familiarity drives the Database of Intentions. As yet, the Database does not exist as the author envisions.

Internet search has evolved into a collection of clickstreams, a coined word the author uses to encapsulate the idea that any particular user of the Internet leaves a trail of clicks on links to site URLs (Universal Resource Locators). This trail of clicks can be recorded for future analysis or nearly real-time analysis. Google's PageRank and Amazon's recommendations system are examples of contemporary clickstream analysis. "Most visibly, all search engines mine clickstream data to present advertisements that attempt to match your stated intent" (p. 12).

Internet users accept clickstream analysis technologies because they make life easier, but the author warns that clickstream data can also be misused to spy and pry into individuals' lives without their knowledge, possibly violating civil rights. Some analysts think that the PATRIOT Act has already opened the doors to government abuse and that trends in corporate surveillance of employee computer use could lead to clickstream analysis abuse. A complicating factor is that nobody knows who owns clickstreams or other data collected through Web application use. A potentially dangerous trust level exists among Internet users, who trust that their data will not be abused.

Ultimately, search should work like the computer on *Star Trek* or the android Data on *Star Trek, the Next Generation*. The user should ask the computer for something, and the computer should be able to infer what the user wants. Movement is heading in this

direction, but there is a very long way to go. Fundamentally, though, the goal of search is to efficiently provide people with useful information.

Chapter 1, The Database of Intentions Analysis

The author expresses his vision for the future of computing, at least from the search provider's and Internet user's perspective. Over the years since the decline of dot-com companies in the late 1990s and early 2000s, his vision has demonstrated its validity through the success of Google. By improving search, Google transforms from a zero-income startup to a $4 billion company. Not mentioned in the book is the rise of the verb *to google* in the common vernacular, as in, "I don't know the answer, why don't you google that?" The meaning here is to do an Internet search on the question, whether the searcher uses Google or not. Whether or not this term sticks as a generic word for search is unknown, and the continuing success or failure of Google as a company is also still to be seen.

Still, search has its draws. If only five percent of the search potential has been tapped, this means that more mountains of money are to be made by bright, probably young, entrepreneurs. Implicit in Eric Schmidt's change of attitude toward the idea of being a media company is that search, treated as media, makes a lot of money over an astoundingly short period of time. So far, the potential for growth in search has not been hampered by government regulation, lawsuits or user backlash, but the crippling regulation and lawsuits may be in the future. The big question is who owns the data one leaves behind through using search on the Internet? This is like trying to determine who owns your footprints left behind in the snow or sand. One take is, who cares? The footprints are worthless. What if footprints become valuable, as they are with search? Does the creator of footprints or clickstreams have any inherent stake in them?

This becomes a very important question when considering privacy issues. So far whatever damage is being done must not be harmful enough to Internet users to cause a reaction. Nobody seems to be complaining, other than a few alarmists (or visionaries?) who warn that Big Brother is on the way, if not already here. Meanwhile, most users accept the advances in search technologies that help them to find what they want, and oftentimes, buy what they want. The reader should keep his or her eyes on the buying ball. Without money coming in, advancement in search would be dead.

This chapter ends with the very attractive *Star Trek* ideas of what search can become with AI (Artificial Intelligence). The history of communicating with a computer starts out with users entering binary numbers through switch panels. Next, users begin submitting pre-coded programs to the computer, and then issuing commands through a command-line interface. The next type of interface involves selecting menu items, and finally the GUI (Graphical User Interface) idea of clicking on things is developed. This clicking notion extends to the Web, and with search, entering keywords has become an important way of interacting, not with just one computer, but many computers worldwide. What if we could simply have a conversation with our Web-connected computer and the computer would serve up our desired results? That would be nice.

What if we all had Commander Data androids to help us? The world would be quite different, one imagines.

Chapter 2, Who, What, Where, Why, When, and How (Much)

Chapter 2, Who, What, Where, Why, When, and How (Much) Summary

Most search engines work by taking the keywords entered by the user, creating a database query from the keywords and returning a list of URLs that includes a summary of content for each URL. Components of a search engine include a crawler that sends information requests out on the Internet and collects information from Web sites, an index created from the information gathered by the crawler and a user interface to construct the database queries and to return the results. This basic model has remained largely unchanged since the 1970s.

Search results are termed SERPs (Search Engine Result Pages). Just how relevant the SERPs are to a user's keywords depends on how often the crawler visits and revisits Web pages and how much information the crawler gathers. The amount of information gathered has expanded over the years to include document, video, audio and metadata (information about data) files. Google's search engine analyzes more than 100 factors when deciding the relevance of the SERPs to the user's keywords. In addition, Google pre-processes relevance from the main index database and puts the results into an intermediary index, thus speeding the SERPs to the user. Intelligence is coded into most search engines to help the user to refine the search by suggesting possible additional or alternative keywords.

Both American and international users use search engines, with 85 percent of US users doing searches more than twice per week, according to a 2004 research paper. Worldwide use was an average of about 550 million searches a day in 2003, with growth around 10-20 percent per year. In the US, search growth is closer to 30 percent per year. Of these searches, 65 percent is for information. Entertainment accounts for 20 percent, and 15 percent is commercial in nature, with some researchers claiming more than 35 percent as commercial.

As of the first quarter of 2005, Google has 51 percent of the global search market. Yahoo has 24 percent. MSN has 13 percent. AOL has 5 percent. Ask Jeeves has 5 percent, and all the others have 2 percent combined. The rest of the world does five times as many searches as users in the US, indicating that future significant search growth will have an international flavor, including supporting multiple languages. People generally search the Web to find something they know already exists or to discover things that they assume must be on the Web somewhere. People search at home and at work, with the overall searches split evenly between the two environments. Search traffic tends to increase in the morning and evening hours.

The search industry has grown from a few million dollars in revenue in the late 1990s to $4 billion in 2004, and the estimated growth is to $23 billion by 2010. This growth is due to the ability of search to yield marketing leads, which are valuable commodities in commerce because they represent potential customers. Google has more than 225,000 advertiser relationships, a very large number when compared to traditional media outlets. Around 40 to 50 percent of searches yield results that include paid ads, and for Google and Yahoo, these ads result in a 13 to 14 percent response rate. When a user responds to an ad, revenue flows in the form of a pay-per-click fee to the search provider.

Chapter 2, Who, What, Where, Why, When, and How (Much) Analysis

The author explains how search works, who uses it and when, where people use search, why they do so and how search can make money by selling advertisements on a pay-per-click basis. The action of searching the Web is becoming a common daily activity across the United States and the world. People do this for many reasons, but the significant reason for search providers is when people search to buy something. Somewhat less significant is when searches for other reasons yield ads that attract attention. This can result in a click on the ad, and that makes money for the search provider.

This development in search has blossomed over the past five or so years and represents a significant new marketplace. In addition, the marketplace has the potential of benefiting all businesses that use search advertisements, especially when analysis technologies enable better targeting of ads to potential customers. People have embraced search as a necessary part of the Web experience, where finding information via search is replacing older methods of information collection, such as a telephone call. The Web offers more information than was previously available, enabling customers to make more informed purchasing decisions.

Search might replace local advertising, such as the yellow pages of the phone book. Yellow and white pages are already available on the Web, but search technology can be optimized for local searches. This in turn can draw potential customers away from paper-based telephone references. Another potential development in search is to analyze a person's recent behavior on the Web and feed the user ads that relate to the behavior. The author uses an example where a person searches on the term "Lincoln" and clicks on results that are not related to President Lincoln. Ads for Lincoln automobiles will then start appearing in subsequent search results.

Chapter 3, Search Before Google

Chapter 3, Search Before Google Summary

Before the World Wide Web, the Internet exists as a relatively small public network used by computer-savvy people. Knowing FTP (File Transfer Protocol) line commands is necessary to retrieve files off of the early Internet. The trouble with this early scheme is that the Internet user has to know the exact IP (Internet Protocol) address or DNS (Domain Name Services) name of the server that holds files of interest.

In 1990, Alan Emtage creates Archie, the first Internet search engine, as a solution to this basic problem. Archie works like modern search engines, consisting of a crawler, an index and a command-line interface. This is enough for the users of the time, mostly college students, professors and computer-savvy professionals. In 1993, the Veronica search engine is created at the University of Nevada, but while Archie is based on FTP, Veronica uses Gopher, a more full-featured Internet file-sharing program that connects directly to a file of interest instead of to the computer that holds the file. This eliminates the need to look for the file and transfer it with FTP commands.

The World Wide Web is introduced in 1993, spurring rapid Internet growth and interest in Web search. Mathew Gray of MIT (Massachusetts Institute of Technology) develops the first Web search engine, Wanderer. In 1994, Brian Pinkerton develops WebCrawler. It is unique because it indexes the full text of Web documents instead of just titles. AOL buys WebCrawler in 1995, its first Web-related asset. In 1995, Louis Monier of DEC (Digital Equipment Corp.) unleashes his AltaVista.com on the public, an index of all Web pages, less than 10 million at the time, on a single DEC Alpha computer. This is done to promote the new Alpha computer with its 64-bit processor, but the quick Web searches and high functionality that AltaVista enables make it a popular site. Innovations include language translation, audio and video search and clustering of results. Within the first year, AltaVista has more than 4 billion queries, and by 1997, it has 25 million per day.

Compaq buys DEC in 1998, including AltaVista. Rod Schrock of Compaq takes over AltaVista, and with intentions of taking it public, he transforms it into a portal. Monier leaves the company, and Compaq sells AltaVista to CMGI. CMGI wants to take AltaVista public, but the Internet bubble peaks and starts its slide downward before this can happen. CMGI sells AltaVista to Overture Services, Inc. in 2003, and later on, Yahoo buys Overture. AltaVista becomes a simple search box for Yahoo, and Monier ends up working on eBay's search engine.

Paralleling the development, rise and fall of AltaVista, Dr. Michael Mauldin's Lycos, created in 1994, becomes a popular site. Innovative parts of the Lycos search engine are the abilities to analyze outbound links on a Web page, to build a bigger index without extensive crawling and to include Web page summaries in the search results. Excite's rise begins in 1995, peaks in 1998 and ends with bankruptcy in 2002. The

portal's most notable innovation is the customizable user page. Yahoo survives the Internet shakeout and becomes instrumental in advancing Google.

Jerry Yang and David Filo create Yahoo in a roundabout way. They first create an Internet crawler to collect basketball player information in order to win a fantasy league. Later, they make the Jerry and David's Guide to the World Wide Web in 1994, renamed Yahoo in 1995. That year, Yahoo acquires $2 million in venture capital and uses banner ads to generate income. Search becomes a part of Yahoo, with AltaVista providing the service. Yahoo grows and keeps its focus on navigation of the Web rather than search. Eventually, Yahoo uses Google for Web search.

Chapter 3, Search Before Google Analysis

The author gives a brief history of the Web from the search point of view. Prior to search, the Internet is a relatively small network of Unix nodes, each with a unique IP address and DNS name. The number of nodes is so small that those who want to use the Internet often receive or obtain a list of useful nodes from professors, colleagues and books about the Internet. When Archie and Veronica appear in the early 1990s, using the Internet becomes more convenient, but this is not enough to attract the hoards of users that the World Wide Web does.

The World Wide Web, introduced in 1993, does a few simple things to the Internet. The first thing is to allow hypertext. Hypertext is text that contains coded tags. These tags set up fonts and graphics. They also allow Web sites to link to other pages or other sites. The language for hypertext is HTML, or HyperText Markup Language. As before, anyone can obtain an IP address and DNS name, but now creating Web pages is added to the mix. A major part of the Web is the domain name, which usually starts with www to differentiate Web pages from older Internet sites. Those who create Web pages are called Webmasters, a name that persists to the present time. A collection of Web pages at the same domain name is known as a Web site.

For long-term Internet users at its inception, the World Wide Web seems a curiosity but not something to take very seriously. It is, in fact, a bother, in that the downloading of HTML and graphics takes a long time over the slow-speed dialup connections of the day. The long-term users call the graphical interface the World Wide Wait, and sites tend to carry both the old style command-line Internet along with the newer graphics. Things are happening fast in the computing and networking world, though. The PC is becoming more popular as prices lower and people discover the usefulness of AOL, CompuServe, Prodigy and other private online services. Popular games start to appear that work over networks, and the private networks begin to include Internet access. Meanwhile, the telecommunications companies are building out fiber channel networks to handle high-speed Internet traffic, and broadband connections are coming to households. Corporations already have broadband in the form of T1 or higher speed lines and LAN (Local Area Network) connections to the Internet through the T1s.

The buildup of search to the bursting of the Internet bubble that begins in the late 1990s causes a great deal of activity, mostly in Silicon Valley. AltaVista has its years of success, as do Lycos and Yahoo, although Yahoo concentrates on Internet navigation rather than search. When things start to unravel, Internet businesses disintegrate at breathtaking speed. Only Yahoo comes out of the fray relatively untouched, and the company ironically bought AltaVista as its search engine. Even more ironic, Google is about to become a success in the midst of the Internet bubble-burst.

The reader should remember that other parallels happen in the bursting bubble time. The terrorist attack of 9/11 puts the country into a mourning period that might have paralyzed Web development. The infamous scandals of WorldCom and Global Crossing impact the telecommunications businesses that support Internet backbones. Computer companies like DEC and Compaq are merging, and the ramifications of the mergers are still being felt in the computing industry today. Despite all this negative influence, Google becomes a success because the potentials of search are just starting to be realized, and Internet use is still growing by leaps and bounds. The Internet keeps on growing as both individuals and corporations find new uses, such as Weblogs, or blogs, and shopping services that help consumers to find information about products and the best prices.

Chapter 4, Google Is Born

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Larry Page and Sergey Brin start BackRub, a precursor to Google, at Stanford University as a project to determine what links lead back to a particular Web page. In 1996, Page lets his unique crawler loose from his own Stanford Web page. The idea is to build a mathematical graph of the relative importance of Web sites, and thus create a ranking by site importance. Page, an admirer of Nikola Tesla, wants BackRub to be both an interesting academic study and something useful that could be commercialized. Tesla is known for doing interesting studies, but he never profited from any of them. Where Page has the vision, Brin brings his mathematics talents to the study. Between them, they build the underlying philosophies and technologies that will become Google.

One of these core technologies is PageRank, a central mathematical algorithm that accounts for the number of links to a particular site and the number of links to each of the linking sites. PageRank determines popular Web sites from less popular sites and builds an ordered list, from most to least popular. Page and Brin realize the importance of this algorithm for search, but not quite immediately. They see many ways that such an algorithm could be useful, but it is not until they compare PageRank results to the results from AltaVista and Excite that the light bulb glows brightly.

Page and Brin create a rudimentary search engine with the PageRank algorithm as its core. ." . . Page and Brin realized it [the search engine] would scale as the Web scaled - PageRank worked by analyzing links, so the bigger the Web got, the better the engine would be. That fact inspired the founders to name their new engine Google, after googol, the term for the number 1 followed by 100 zeros. They released the first version of Google on the Stanford Web site in August, 1996" (pp. 76-77).

Page's dormitory room becomes the first Google data center, where the two young entrepreneurs put the computing equipment they scrounge from around campus. Brin's room becomes the first Google office. Early problems they encounter include negative reactions from Webmasters who think that BackRub, the Google crawler, is stealing their entire sites from under them or is eating up too much bandwidth, which is the network capacity for a particular site. Note that Web hosting companies charge their customers for how much bandwidth they are allowed to use, so this is like stealing a commodity from commercial sites. An online art museum expresses particular irritation at BackRub's crawling and threatens to bring a lawsuit. Also, Webmasters are often upset over their sites being ranked lower than others. At one point, Google brings the entire Stanford Internet connection down to its knees.

Page first tries to sell Google to other Internet companies like Excite and Yahoo, but the companies turn him down. Page and Brin then look for help, and through their network of people, they receive $100,000 funding from Andy Bechtolsheim. Susan Wojcicki rents a spare room in her house to Page and Brin, where further development of Google's

technology and company takes place. The company outgrows its small space, and in 1999 Google relocates to University Avenue in Palo Alto. Since the Internet bubble has yet to burst, venture capital comes in after Brin and his marketing people set up live demonstrations. The plan for making money is to outsource Google search to other Internet businesses, but this scheme does not work.

Chapter 4, Google Is Born Analysis

The story of how Google starts illustrates that great ideas sometimes have humble beginnings, in this case as an interesting mathematical project. Page and Brin do not sit down one day and dream up the revolutionary idea of improving Internet search. The realization that BackRub and PageRank could vastly improve the relevance of search results comes later. Carrying on the irony of Google's early development, nobody grasps just how much potential Google has to change the Internet and how people will interact with it. Part of this lack of vision can be attributed to the Internet bubble and how this affects people's judgments when it comes to business realities. Another influence is that new technology, especially revolutionary technology, often fails to gain immediate recognition.

When Page and Brin first meet, they do not like each other. Yet their common interests in the Internet and mathematical analysis draw the two together into a tight partnership. How people work with each other in academic and technical environments becomes very important in the Google story. The Silicon Valley mentality of the bubble years keeps people cooperating to bring new Internet companies with significant technologies and ideas into the business world. Sometimes the reason a venture capitalist funds a new company is to help an existing interest. Michael Moritz says, '"When we looked at Google, the idea was that it would power a lot of other sites, most notably Yahoo"' (p. 90).

Regardless of a boom economic time, new companies still need to have a business plan as to how the money is to be made. The failure to sell Google outright to other established Internet companies prompts the decision to use the OEM (Original Equipment Manufacturer) model, where Google services would be sold to other companies instead of the full Google infrastructure of computers, network connections, software, engineers and supporting staff. This is a time-proven business model, especially among computer hardware manufacturers, but it proves to be a poor one for Google. Google needs a greater stream of revenue to make it profitable and to provide the venture capital investors with good returns.

Chapter 5, A Billion Dollars, One Nickel at a Time

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The author gives Bill Gross credit for creating the business model that Google needs to become profitable. Gross has a long history of starting successful businesses, and his entrepreneurial instincts lead him to a model that involves small individual transaction profit with very large transaction volume. He makes his millions a nickel at a time. Bill Gross is also man with an abundance of ideas for new businesses. Through his relationship with Steven Spielberg, Gross decides to create a company known as IdeaLab to enable his perfect job. The perfect job for Gross is to think up new ideas all day long and let other people carry out the tasks he considers too mundane. If a business idea takes off, fine. If not, then move on to the next one. IdeaLab brings together a single team of people to carry out the tasks for starting new businesses, avoiding the difficulty of building a team every time a new idea comes along. IdeaLab becomes very successful until 2001, when the Internet bubble bursts and dries up capital investments in new Internet companies. The one company that remains is Overture.

The precursor to Overture is GoTo.com, an attempt Bill Gross makes to eliminate the problem of spam in search results. His thinking involves the notion that advertisers will be willing to pay more for quality traffic to their sites, meaning paying customers, rather than high volumes of low-quality traffic, or those visitors who have no intention of buying. In order to make this happen, the friction of money has to be added to the equation. He decides to charge advertisers for the rights to search keywords in his search engine. However, he does not charge them up front, only when a customer clicks through an ad to an advertiser's site. This becomes the model for today's paid search market.

When Gross introduces GoTo.com and its paid keyword advertising scheme, the press rejects the idea as being against media ethics. Nevertheless, the idea catches on with advertisers because they know that their marketing dollars are not being wasted. With other types of advertising, half the money goes to waste. GoTo.com starts to earn significant money and changes its name to Overture in 2001. Gross tries to interest Google, but Page and Brin reject the idea. At this time, Google is not making a profit. In 2002, Google changes its mind and adopts the pay-per-click model in the form of AdWords.

After Google brings in AdWords, the company has all three elements to profit and control its own destiny. Google has the search engine, a paid search network and its own traffic. Microsoft and Yahoo only control the traffic, and Overture only has the paid search network. Realizing that they lack all three components, the three companies try

to acquire search engines. Overture is finally sold to Yahoo for $1.63 billion. Meanwhile, Bill Gross thinks he can do one better than Google with his newest idea on search engines.

Chapter 5, A Billion Dollars, One Nickel at a Time Analysis

In perfect hindsight, Bill Gross believes his Overture company could have beat Google to the lucrative pay-per-click advertising market. The fact that Google has the better search engine tends to cast doubt on this back-looking analysis, and when Gross sues Google over patent infringement, the analysis looks shaky. What Bill Gross develops is not something new in the world of business, and in fact the high-volume with low profit margin idea is behind every commodity market. What he does is meld the idea into the Internet, a network considered by many to be part of the media, similar to newspapers and television. As Gross demonstrates, the Internet is different. The Internet consists of interacting people moving from site to site, and this makes up traffic. Traffic volume is what every Web site wants, especially commercial sites. Traffic translates to profitable commerce. Bill Gross connects high-volume, low profit margin with Internet traffic in the form of pay-per-click advertising sales, and this becomes the core model for Internet business advertising.

Bill Gross might have lost the potential of Overture to make big money, but he proves the viability of search to make profit. Google simply takes the idea and runs with it through AdWords, settling out of court for the patent infringement lawsuit. Gross still has his dream environment at IdeaLab, and he has ideas to make search spam-proof. He sees that Google is starting to have problems with spam, and with his newly acquired wisdom, he sets out to develop the spam solution. Does he have the engineering talent to do this? He certainly has the business talent, as demonstrated by Google's borrowing, albeit paid borrowing, of his pay-per-click idea. Conversely, does Google have the business talent to keep on growing?

Chapter 6, Google 2000-2004: Zero to $3 Billion in Five Years

Chapter 6, Google 2000-2004: Zero to $3 Billion in Five Years Summary

Google's first attempt at making money uses the CPM (Cost Per M, the Roman numeral for one thousand) model, which amounts to charging advertisers by the number of ad views rather than ad clicks. CPM is the prevailing business model before Bill Gross comes along with GoTo.com and pay-per-click. Until that time, Google tries a patched-together business plan of CPM and keyword-based advertising with banner ads as backup in case revenue falls too far. This works well enough until the NASDAQ market crash in 2000. This dries up advertising revenues for both Google's patched-together plan and banner ads. Forced to seek out a working business plan, Google turns to Bill Gross and GoTo.com. This leads to the AdWords product that Google introduces in the fall of 2000.

Google tries traditional brand marketing in 1999 but realizes that the marketing budget eats up half of the available revenue. Google then opts for PR (public relations) in the form of stories in the press, and this works satisfactorily. In effect, Google becomes the only company that does not spend money on marketing. Over the long haul this works out, but at the time, Google wonders if it is making a big mistake.

When Page and Brin build out the Google hardware, economics forces them to design a parallel system from cheap CPUs, memory and disk drives. The failure of any one part of the system does not affect the other parts, and as components fail, they are simply replaced with no need to disrupt the Google services. This also allows rapid and relatively inexpensive scaling of the hardware in support of Google's growth. The author gives credit to Page and Brin for developing parallel computing, but this is arguable. Note that IBM's Deep Blue, consisting of 512 computers running in parallel, beat chess master Gary Kasperov in 1997. What Google does is bring massive scalability using inexpensive hardware to the notion of parallel computing.

As Google expands, it needs to hire more employees. This can lead to a hiring spiral, where employees can be considered A, B, C and D grades, from best to worst. A employees tend to hire B grade. B employees hire C grade, and C employees hire D grade. Page and Brin attempt to avoid the hiring spiral by putting prospective hires through extensive batteries of interviews by committees. The hiring decision is made through debate among committee members. A particular difficult hire is the CEO that the venture capital investors insist be put into place. Eventually, Eric Schmidt gets the job. Page, Brin and Schmidt form a triumvirate, a three-way leadership with each leader sharing the responsibility with the others in a spirit of consensus and partnership. The month of Schmidt's acceptance of the CEO position, Google turns its first profitable quarter.

In 2001, Google tries to identify its core values as it struggles to control its own growth. The core value that is accepted is Don't Be Evil, a statement that can be taken as a positive force for thinking things through or as an arrogant stance that is indefensible. Amazon CEO Jeff Bezos comments about the motto, "'Well, of course, you shouldn't be evil . . . . But then again, you shouldn't have to brag about it either'" (p. 139).

Google's growth through 2001 and 2002 prompts the triumvirate to try different management styles, first the standard corporate hierarchy followed by a flattened organization. The company acquires several different Internet enterprises, attempting to spread its influence into possible revenue streams across the network landscape, but profit is not realized until the CPM model is dropped for the pay-per-click scheme in early 2002. The company tries to be less evil than Overture by disallowing clients to simply buy their way into the top of search result listings, and this generates positive PR. A key deal with AOL in May of 2002 boosts Google into the same league as Yahoo, eBay and Amazon. By mid-year 2002, Google's success becomes the primary buzz in media stories about the Internet because the company represents honesty along with making significant money. After the business scandals and the 9/11 terrorist attacks, the feel-good stories about Google garner the public's attention. The downside of all this attention is to promote a "culture of insular arrogance" (p. 146), where the company suffers from unresponsiveness, self-centeredness and cockiness. A negative buzz starts to build around Google as the rysumys of the many unemployed information technology workers flood the company and overwhelm its hiring process. More negative buzz is generated as advertising clients feel ignored, primarily due to Google's philosophy of automating everything to reduce the need for customer relations employees. Despite these drawbacks, Google continues along its rapid growth path.

Chapter 6, Google 2000-2004: Zero to $3 Billion in Five Years Analysis

As Google flounders with its business model, the technology continues to work far beyond expectations. A period of uncertainty strikes the company, where management approaches are tried, abandoned and retried. Is Google's fate to become a nice little company that does not make much money, if any? Fortunately, the AOL deal advances the company into a positive revenue flow, averting bankruptcy. Something else is missing, though, something that will push Google into a period of extremely rapid growth, including all the challenges that this brings along for the ride. The missing part of the puzzle is the pay-per-click model that Bill Gross develops for Overture. Without taking this approach, Google would have spent its existence as a mediocre, uninteresting little Silicon Valley business. The reader should note the irony that Google takes technologies and ideas with little regard to patents or copyrights while taking the motto, Don't Be Evil. The author tries to soften this situation through rationalizations that this and other behaviors, perhaps not so evil but not so good either, are common among companies with very intelligent, young leadership and staff.

As Google grows its economic success from the roots that Bill Gross developed, and the technological power that the company's founders and engineering staff built, the

general press picks up on the story and creates enormous positive buzz. Along with this, the poor performance of the company's hiring process and the irritating behavior of its employees create negative buzz on the grapevine. Google becomes both loved and hated, depending on one's point of view and experiences with the company. Some of this negative feeling can be attributed to sour grapes, but some of it is also deserved. Being the only big success among an ocean of failed businesses promotes bad human behaviors in the forms of arrogance, unresponsiveness, self-centeredness and other obnoxious characteristics. Granted, this is common in high-tech business communities, up until something very bad happens to knock the egos off their high perches. During the burst, this takes the form of a business downturn with massive layoffs.

Pride has its fall, but will Google fall? Or will it continue on its upward path? The company is doing things that do not depend upon traditional mixtures of business practices. Google has no tangible product. The clients simply buy advertising, and their advertising dollars are not wasted, as happens with other forms of marketing. Meanwhile, the targets of the advertising, Google users, find high value in the search service and other offerings. They also tend to respond to the advertising. The data center infrastructure is parallel and near bulletproof. What might happen to knock Google off its feet? Business storm clouds do not seem to be forming, but what if the Google data center experiences a big earthquake? The author does not explore this possibility. If Google's data center does not have a disaster recovery plan, such as mirror data centers located across the country, perhaps around the world, and the Big One hits, that could mark a rapid end to Google's success.

Chapter 7, The Search Economy

Chapter 7, The Search Economy Summary

Small Internet businesses such as Neil Moncrief's online shoe store drive most of the Internet commerce. Since most of these businesses depend upon search to bring customers to their sites, dependence on Google develops as Google's growth gains momentum. This is fine up until Google tweaks its search results algorithm on November 14, 2003. Suddenly, many small Internet businesses suffer because the search results no longer list them at or near the top. The changed algorithm places them far down the results listings where customers can no longer find the businesses. The Google tweak, known as Florida in reference to disastrous hurricanes, seriously hurts many businesses by thwarting their SEO (Search Engine Optimization) strategies, an unintended side effect of Google's attempt to thwart search spammers. For Moncrief's store, no SEO is done, yet he suffers along with the others.

Google offers Webmaster guidelines that purport to explain the best practices for legitimate SEO, but they are vaguely worded. As a result, legitimate businesses, called white hats, are counted in with the illegitimate spammers, called black hats. The new Google algorithm sometimes cannot distinguish between the two hat colors, and so legitimate businesses are banned from the Google index. Meanwhile, the black hats are always trying to outsmart search engines in order to divert traffic toward their sites, and this activity is driven by the fact that traffic equals money. Google has two kinds of search results, the organic, or non-commercial, and the commercial. Black hats try to infiltrate the organic results, and Google's challenge is to thwart their attempts. Between the black and white hats, regions of gray exist. When white hats enter the gray region, they are at risk of being banned from Google's index. The trouble is that the white hat businesses do not know exactly at what point they cross from white to gray. One way to avoid the gray region is to purchase AdWords and AdSense from Google, in effect abandoning the organic results in favor of the commercial results. However, people tend to click on organic results more frequently than commercial results. After a few months, white hat businesses begin showing up toward the top of organic results again, indicating that Google has no intentions of harming small Internet businesses to improve Google's cash flow.

Google's paid search ads work better than traditional forms of marketing, such as paid television ads. The primary reason for this is that people who use the Internet behave differently than when they watch television. The Internet is a highly interactive environment, where the users express their intents in many different ways. Most visibly, users show their intentions by their search keywords and click trails. Television is a one-way street. Viewers passively watch and hardly ever interact with the programming content. Ads are fed into the viewer's experience without the viewer ever indicating any interest, and the viewer cannot simply click on an ad to see more information. With the Internet, users see ads that are tied to their expressed interests, and the chances of the

interested viewers clicking on the ads are good, much better than the chances of a passive television viewer responding.

Combining smart television in the form of TiVo or similar DVR (Digital Video Recording) technology with Web search leads to interesting scenarios. The author paints two scenarios that are highly probable in today's connected world. The prospective customer's intent can be discerned via the use of the Internet, and special ads can be fed via the DVR technology. This might happen on cell phones with Internet connections too. All the ads follow the prospective customer's intent, and along the way, the consumer's interest might be sparked enough to cause him or her to become a paying customer. As computers with Internet connections become commonplace in household appliances, automobiles and cell phones, the possibilities expand to where intent and ads meld to become a useful consultant for people in their everyday lives. From finding the best price for a bottle of wine to discovering the lowest-cost gas station, the possibilities seem limitless. Will traditional marketing practices then become obsolete? This might happen as businesses realize that the new forms of marketing make better financial sense. Less money will be wasted, and "As Tim Armstrong, VP of advertising at Google, puts it, 'search turns a cost center into a profit center'" (p. 171).

Other impacts of search on how we do business are already here. Buying music online is becoming the preferred way for a whole generation of music enthusiasts. Newspapers and magazines are being replaced by customized online news feeds and the Web versions of printed matter. Blogs have become alternative sources of information, perspective and opinion. How will business plans change to fit the Internet? The author thinks that the content needs to be worth people's attention, or putting it another way, worth people's intent. When the intent can be discovered, the advertisers will follow.

All is not sunshine and roses in the search business model. Troubles with trademark lawsuits and click fraud plague Google and other search companies. With trademarks, Google tries to be fair to all its users and advertising clients, but only so much can be done to protect trademarks. Lawsuits are currently underway to determine what can legally be done. With click fraud, programs exist in the public domain that click repeatedly on a predefined spot on the screen. This can be abused to take money from advertisers or to artificially raise their marketing costs. Click fraud is currently the most important thing to control for search businesses.

Chapter 7, The Search Economy Analysis

With Google's success comes responsibility to its paying advertisers. Other businesses have come to depend upon Google, and when things are changed, the changes can hurt the other businesses significantly. The search engine tweak that Google does right before the holiday season in 2003 might be in response to a detected spamming problem, or it might be the result of poor thinking and planning. Either way, Google learns an important lesson regarding its new level of responsibility. Paying clients cannot be ignored without major repercussions, no matter how smart or good the

company's leadership and engineering staff are. Nobody cares about this when their business is hurt by an ill-considered decision. Google will need to reach for a higher level of customer service, if it has not done so already. This is often part of the corporate maturation process for companies that grow significantly over a short period of time after startup.

The reader learns that there are white hats and black hats out there in the Internet. The white hats try to play by the rules, but the black hats do not. They purposefully try to mess up Google. Meanwhile, the rules that white hats try to follow are vague, and so the gray region develops. Black hats can enter under the safeguards, and white hats are often misidentified as black hats. Other problems include lawsuits about trademarks and the very damaging situation of click fraud.

The author points out that fraud and lawsuits are nearly universal business truths. The example of Microsoft and its woes after a government lawsuit is but one in a vast field of examples. Fraud detection and correction are common parts of financial and telecommunications businesses, as well as literally every business that deals with money. The simplest kind of fraud is shoplifting in retail. It is simple but deadly to the bottom line if not controlled. Google has its challenges as it grows into a mature company, the least of which are the concerns expressed over the hiring spiral. That situation could very well be impossible to control and undesirable as well. Perhaps an organization functions well with A, B, C and D grade employees, and perhaps the management challenge is to promote the A grades while fitting the lower grades into appropriate positions. This works for many businesses that have been around for decades.

Between the problems that Google has encountered and continues to grapple with, the author gives visions on how paid search ads can work with other emerging technologies to make life easier for people. A husband gains the approval for his purchase of his miffed pregnant wife. A young professional finds the best deal on wine in his local market. The possibilities are certainly attractive, as long as they do not become annoyingly interruptive. Popup ads have already gained enough disdain to encourage popup blockers in computer security software. Animated banner ads might be next to feel the wrath of annoyed users. Anything that arrogantly interrupts an Internet user's experience on the Web is likely to be a target for software developers who share the feeling and want to make money by providing solutions. Hopefully, the enhancing technologies and ideas will win out over the annoying ones. This might be true for the Internet, as its unique interactive nature has already enabled revolutionary business trends.

Chapter 8, Search, Privacy, Government, and Evil

Chapter 8, Search, Privacy, Government, and Evil Summary

One of the potential problems with search is that public information that was formerly difficult to find is now at the fingertips of an Internet user. This can be a case of too much information for one's own good. What shows up in an Internet search about a private individual may be negative, like hits on divorce proceedings or criminal records. In the case of Mark Maughan, a blog site comes up that takes him to task for filing suit against Google regarding his information in the index. He did not like it when he filed the suit, but now things are arguably worse for Mr. Maughan. In another case, a son discovers that his mother abducted him after losing a custody battle. The son no longer talks with his mother. In other situations, search information about an individual can be beneficial. A woman checks on a date and discovers that he is wanted by the FBI, indicating that in the Google age, it is only prudent to do a check on people you are about to meet. How much information should be available on the Internet? The Florida Supreme Court considers this question in 2003, and its decision is to call for a full review, which is due sometime in 2005.

Google encounters an odd reaction to its Gmail and the AdWords ads that accompany users' email. Because the ads are relevant to the content of the email, users think that Google is actually reading and comprehending, as a human comprehends, the email content. A PR crisis ensues, and a California state senator introduces a bill to stop Google from reading user mail, even though this is not the case at all. However, GDS (Google Desktop Search) indexes the user's hard drive, and although the information never leaves the hard drive, Google has the ability to serve local hard drive information to the world. The net effect of this is to encourage people to distrust just how much of their private information is being collected and distributed. When one enters the Internet, is someone tracking usage? This might very well be so with the PATRIOT Act that covers email, Web surfing and all other forms of communications. The PATRIOT Act is highly controversial. Congress passed the act with no review or debate shortly after the 9/11 terrorist attacks, and since then, local governments are passing laws and ordinances that seek to protect the citizens' right to privacy and to free speech. The PATRIOT Act is due for renewal in the fall of 2005. Another reality is that someone is likely tracking your Internet usage. Google does so, and so do other ISPs (Internet Service Providers) and search companies. This is not a question, but what is a question is whether or not the tracking entities do anything with the information. The information is there, but is it being analyzed?

The author brings up concerns about Google's do-no-evil motto being unrealistic. "While our government is - at the end of the day - accountable to the people that fund it and

elect its leaders, a public company, even one as well-intentioned as Google, is accountable to two forces: its leaders and its shareholders. And at no company are policies immutable" (p. 204). Google's experiences with the Chinese government and the company's capitulation to the demands of this repressive government are signals that lofty principles will be compromised to gain the benefits of the Chinese economy. Although Google tries to cast its actions in the light of better experiences for users, few believe this to be true.

Chapter 8, Search, Privacy, Government, and Evil Analysis

Search, along with its ability to track clickstreams, can be used to track people on the Internet and to discover information about people that, although technically public, might be damaging. A good practice is to check on one's own information at regular intervals to determine if the search returns anything that might be harmful. However, search can also be useful for determining if your date is wanted by the FBI or other such potentially useful information. Information by itself is neutral to the search engines. It is just information. A certain amount of government regulation on what can be put on the Internet might be necessary to protect the privacy of citizens. The author does not point this out, but a great deal of information can be found on Web sites that charge a fee for the service. Old addresses, college information, real estate deals and court records are all fair game on these pay sites. In our brave new Internet world, it has become more difficult to keep secrets.

Is the motto Do No Evil impossible to achieve? What exactly is Evil anyway? Is it wrong to seek the most revenue flow, even if this means working with a suppressive government? Can any company refuse a lucrative market on ethics alone while competitors freely enter the market? These are questions that Google deals with as it contemplates trade with China. Contrast this situation with Google using Bill Gross' pay-per-click idea and paying for it only to avoid a lawsuit. It seems that ethics are relative to survival, as the pay-per-click business model enables Google's rapid growth. Will Google fully capitulate with the Chinese government to gain entry into the country's economy? A better question might be whether or not Google will find a way to rationalize its actions with the Chinese government. An economy that large and in a long growth phase is hard to ignore, no matter what the corporate motto might be.

Chapter 9, Google Goes Public

Chapter 9, Google Goes Public Summary

Over the first few years of Google's existence, the company is not interested in going public through an IPO (Initial Public Offering) on the stock market. The company generates enough cash income that selling stock to raise capital is not necessary. By 2004, going public makes more sense because an SEC (Security and Exchange Commission) regulation requires a company with over 1,000 employees to report as if it were public. Major pressure comes from Google's venture capital investors who know that the maximum payout for their investments will come from the public markets. Amid a great deal of speculation, Google files its IPO on April 29, 2004, declaring that the company will sell $2,718,281,828 shares. The number 2,718,281,828 is the mathematical equivalent of e, a nod to engineers and mathematicians. In a letter to prospective shareholders, Page writes that "'Google is not a conventional company. We do not intend to become one"' (p. 217). Wall Street takes offense at the letter's tone. Google's stock sells in an auction setting, and the company maintains control of itself rather than letting major stockholders take over. It preserves the triumvirate of Page, Brin and Schmidt. The unorthodox manners of Google cause the offering time to elongate, but the stock finally opens on the NASDAQ on August 19, 2004.

Google finds that becoming a public company brings with it added burdens in revenue accounting, and this leads to a full restructuring of its reporting system. During the summer months before the stock opens in August, Google suffers bad PR when a former senior manager sues for age discrimination. The SEC also recommends civil action against the company's general counsel, and the financial press publishes articles that criticize Google's announced stock price range. Other strange incidents take place, leading to speculation that Google will need to pull its IPO. Google does finally go public, and the stock performs very well.

Chapter 9, Google Goes Public Analysis

When Google files its IPO, Page displays naivete and arrogance in his rambling letter to prospective shareholders. As the company makes blunder after mistake regularly during the months preceding the release of its stock, the press and Wall Street take the company to task. This exasperates the triumvirate, especially Schmidt. He feels that the company is treated like a football during the four months preceding the stock release, but some of this is a result of poor judgment on the part of Google. Making matters worse, the SEC requires a silent period, when the triumvirate cannot respond to the critics of Google. This story has a happy ending. About half of Google's employees become millionaires, and the stockholders make money hand over fist as the stock soars from the release price of $85 to over $200 per share within four months. Apparently wheelbarrows full of profits bring forgiveness for past sins, at least on Wall Street.

Chapter 10, Google Today, Google Tomorrow

Chapter 10, Google Today, Google Tomorrow Summary

Google faces many challenges in the coming years as it grows from 3,000 employees to perhaps 30,000. Continuing to innovate, keeping highly productive employees and learning how to partner with more traditional companies are among these challenges. Shona Brown is hired as vice president of business operations to keep Google from imploding and failing to execute. Page and Brin create a declaration of principles and values for the company, known as the Tablets. Using the Tablets as a base, Brown and Schmidt reorganize Google so that it can scale to a company ten times its present size. This amounts to an organization around core groups of functions, with encouragement for the engineers to keep acquired products viable and to dream of future products.

Google develops an odd culture over its five years of growth, and this culture of Page and Brin might become a major problem. So far, things seem to be working well enough. Schmidt takes over the daily management routines, leaving Page and Brin to follow their visions of product development. This three-way corporate leadership style might be seen negatively on Wall Street, possibly limiting the stock value. Although Yahoo and Google share many characteristics, Yahoo has experienced failure, and Google has yet to fail. Yahoo has learned to work with partners, but Google continues on a chaotic path where meetings with potential partners disintegrate. Brown works the business process side of Google with some level of success, but more needs to be done. Yahoo and Google are dissimilar in the ways that they approach search. Yahoo started with and continues along a human first, technology second approach. Google reverses this with a technology first and human second, and only when necessary, approach.

Chapter 10, Google Today, Google Tomorrow Analysis

Rapid growth is both a blessing and a curse in business, and the curse can be looked at from three general points of view. The hiring process is bound to be full of chaos, wasted effort, bad decisions and the loss of top employees. The management structure is likely to be shaken up several times as the corporate leaders cast about for the system that works the best. The products that bring revenue into the company can suffer, and a surprise downturn can stop the rapid growth. Google has had its share of these problems along its short life, but as the company prepares to ramp up to something ten times its present size, the old problems seem like child's play. The maturity of Schmidt and Brown might hold off disaster, and the fact that Page and Brin recognize their value to the company is a good sign. Rapid growth might be a challenge, but it is not a new challenge in the business world.

The cultural differences between Google and Yahoo are significant. Google still moves along a positive upswing in culture that has yet to be challenged. Although the employees enjoy a free lunch, the company recognizes that business discipline is lacking. Can this discipline be created without the harsh blow of downsizing and the cruel realities of competing in an evaporating marketplace? The Yahoo culture has already suffered through both of these business realities, but the company still moves ahead and has earned its business discipline the hard way. Is there an easier way? This is what Google management seeks.

Chapter 11, Perfect Search

Chapter 11, Perfect Search Summary

The perfect search would work similar to a reference librarian, a human-like artificial entity that could find the exact answer to the question, recommend one source of information over another and have a "complete mastery of the entire corpus of human knowledge" (p. 252). This is the stated goal of almost every major player in search. A trend that will be ongoing is the incorporation of search into devices other than the PC and Web. Examples include telephones, automobiles, televisions and stereos. Eventually, all things of value may have tags that communicate where they are and what they have been doing, including children and pets, thus making individuals searchable. Will the entire breadth and depth of human knowledge become searchable? This will only happen if the world desires it, and that is doubtful. Some data repositories such as the University of California's library system and the LexisNexis news and legal citation services are kept away from search on purpose. We can suppose, and even assume, that corporate databases that contain intellectual property and customer records will also be kept private.

The development of search may continue with the Database of Intentions, made up of clickstreams and the analysis of the clickstreams. The analysis of clickstreams will help the search engine to understand more about the user and keep a history of the user's intentions. This in turn can be used not only by the user, but by higher-level analysts regarding the general use of the Web. If information about the general use of the Internet can be determined, then the results can be used similarly to Google's PageRank evaluation, leading to another possible goldmine on the Web. Right now search engines provide means to navigate through search results and histories, and this is a step toward greater understanding of intent.

The semantic Web is an idea born in 1998, in which Web pages would be tagged with machine-readable, Boolean algebra-based strings of logic. This idea has not taken off except for small search applications focused on single intent areas. One possible area where larger search applications, such as Google, might be able to use the semantic Web idea is the Weblog, or blog. Blogs almost universally include links that are relevant to the blogs' contents. The IBM WebFountain project tries to create a semantic Web for large corporations rather than the entire Web. This approach creates metadata for each Web page crawled and assigns classifications for the page within the metadata. Another approach is to limit the Web sites crawled by some kind of domain definition, such as electrical engineering. This produces search results for a specific community of users, and the results are generally superior to Google's.

Chapter 11, Perfect Search Analysis

The perfect search is certainly a long way from realization. Inferring what a user might want to see in the results is the trick, and perhaps clickstreams can help. The author seems to forget that thinking up appropriate search terms, that is, framing the question in a logical fashion, is a skill in and of itself. If one cannot frame the question, not even a human research librarian can help. Nevertheless, the idea of tracking intent along with the notion of selling goods and services more efficiently on the Web has people thinking.

Focusing on subsets of the entire Web makes sense to specific user communities. A corporation wants its internal information more readily available to its employees. Electrical engineers want the specifications on electrical components. Will these Web subsets become more popular and useful than general Web search? Perhaps the two will work together, where a general Web search yields results that point to Web subsets that might be interesting. The author is most excited about general Web research and the analysis of clickstreams into a Database of Intentions, but who can say what the future will bring? As the author writes in the final sentences of this final chapter, "Perfect search . . . may never be realized. But the journey to find out if it just might be is certainly going to be fun" (p. 280).

Chapter 12, Epilogue

Chapter 12, Epilogue Summary

The author tells the story of his Google search on keywords selected around the notion of immortality. He finds out about the oldest written story, and from this discovery, he finds the translated text as well. Then he thinks about one's name being in Google's and other search indexes forever. Is this a form of immortality?

Chapter 12, Epilogue Analysis

The author's story illustrates two present facts about search. First, the question has to be framed just right to find the desired results on the first try. Second, searches lead to interesting and enlightening discoveries that were not initially envisioned. Search is a powerful research and discovery tool.

Characters

Larry Page

Sergey Brin

Eric Schmidt

Shona Brown

Bill Gross

Alan Emtage

Matthew Gray

Louis Monier

Dr. Michael Mauldin

Jerry Yang

David Filo

Objects/Places

The Internet

The Internet is a collection of networked nodes that contain vast amounts of information. It starts out very small and begins mushrooming around 1993 with the introduction of the World Wide Web.

The World Wide Web

The World Wide Web consists of networked nodes that are named with URLs such as www.something.com, www.something.org, www.something.net, www.something.edu and so on. One can think of the World Wide Web as a graphical interface layered on top of the Internet. The World Wide Web brings the idea of clicking navigation to the Internet.

Search

Search is an application that helps users to find what they are looking for on the World Wide Web. The first search application is Archie, an Internet search. Google, Yahoo, MSN and Amazon are major search competitors today.

Wall Street

Wall Street is the New York financial district that has a great deal of influence on public companies, such as Google.

Venture Capital

Venture capital is money that investors put into startup companies with the hope of reaping high financial returns.

Silicon Valley

Silicon Valley is the area in and around San Jose, California. This is where many Internet companies have their start due to the education facilities and availability of venture capital.

Stanford University

Stanford University is where Google begins. Other well-known companies such as Sun Microsystems and Yahoo have their starts at Stanford University.

Pay-Per-Click

Pay-per-click is a search business model that works to bring in revenue.

Parallel Processing

Parallel processing is a computing architecture that allows many small computers to work in parallel to accomplish very large tasks. It affords the ability to quickly change out failed hardware without affecting the running applications. Google uses parallel processing extensively.

Google Campus

The Google campus is typical for a Silicon Valley successful company, and the employees still enjoy free lunch. This is because Google has yet to experience failure.

Yahoo Campus

The Yahoo campus is typical for a Silicon Valley successful company, but the employees must buy their own lunches. This is because Yahoo has experienced failure but has matured from the process.

Themes

Youthful Idealism

Page and Brin follow a small youthful vision when first building Google. Looking at the Internet as a mathematical graph with nodes and other components of the model leads to a different way of approaching search that yields better organic results than any of the other search engines can produce. Reaching for better organic search results drives Google's development, but at the price of not having a good business model that will bring revenue into the company. Youthful visions are often characterized by great ideas that lack the practical side of business, which is to make profit. The attempts of Page and Brin to keep Google from becoming like other mature companies show their youthful idealism.

Business Ethics

Google attempts to define itself as a business that does no evil. This goal is likely beyond reach, depending on how one defines evil. Is it evil to take the pay-per-click idea, and then pay for it only when threatened with a lawsuit? Is it evil to capitulate to China's repressive government in order to gain access to the market? What about firing a fifty-something employee just before the IPO, thus taking away the employee's ability to profit from the IPO? As time goes on and the competition heats up, the ability to do no evil will likely be stretched to its limits. This could develop into a major problem for Google.

Privacy

As more information becomes known to the search engines, personal privacy becomes threatened. Already public records that were once difficult to access are available online for free or for relatively small fees. If search results show an individual in a bad light, and if this view can be argued against, what recourse does the individual have? Legislation regarding search and privacy is now being constructed, but that does not help present situations. On the other hand, the information available from the Web can be beneficial for understanding new acquaintances and helping law enforcement efforts.

Consumer Revolution

Search and the Web are bringing empowering information to consumers. Traditional forms of advertising become less effective as people shop around online and respond to ads that follow their Web movements. Information delivery will involve televisions, telephones, automobiles and other connected technologies. Marketing strategies will need to transform from straight persuasion to persuasion based on a particular

consumer's desires. The challenge is to determine the intention, possibly from the Database of Intentions, that a potential customer reveals through the clickstream.

Future Business Developments

If only 5 percent of search potential has been realized, what will the other 95 percent entail? The Internet has proven to be a vexing place in which to make money, but money has been made and in significant amounts. Google demonstrates that with a different approach, search results become more relevant to the user. With further development of search relevance, greater advertising revenue can be realized. Still, what about Google's and other search companies' responsibilities to their advertising clients? Will future business pressures demand greater customer service and involvement with corporate decisions? Or will other technologies and approaches push Google aside?

Style

Points of View

The author promotes his vision as a primary point of view, where the Database of Intentions will bring greater opportunities for research into an entire culture's intentions, and this research can take several forms, not just the commercial. He brings in other players' points of view through short quotations from interviews. The reader comes to understand what Page and Brin want Google to become, how Schmidt works with the two somewhat eccentric entrepreneurs and what competitors think about Google. Industry pundits and analysts bring their viewpoints forward, and the conclusions tend to change as Google becomes successful. The author reaches back in time to earlier works that lend depth to the stories and laterally in time to current industry writers. The overall effect gives balance and credence to the book, as opinions and observations espoused are mostly from the original holder of the opinion or observation.

Setting

A business like Google has several settings. The physical setting in Silicon Valley, starting with college dormitory rooms, moving to a house and then to rented office space, has some importance in its proximity to venture capital, Stanford University and many other engineers who work on similar projects. Perhaps this kind of physical setting is necessary for incubating a Google.

An abstract setting exists only in the minds of the entrepreneurs, engineers, investors and management leaders. Corporations exist on paper legal documents. Products for Internet businesses exist in software. Business plans are largely theoretical in nature, and management structures depend upon cooperative efforts between management and employees. The setting is abstract, but when things go very well or very wrong, the effects on physical reality are enormous. Millionaires can be made or broken in this setting. Employees can be advanced or laid off. Entire communities can be created or destroyed.

A third environment exists in the clients that Google serves. Advertisers want to create transactions, and Google users want relevant search results. Purchasing something could be a primary goal, or it could be a goal that develops during the search. This business model performs well when Google works as expected, but it can fall apart if Google tweaks its algorithms without notifying or consulting with the advertising clients. This setting consists of relationships and how Google nurtures, supports and grows them. Conversely, Google can ignore, irritate and kill the relationships. Google can live or die by how it handles itself in this setting.

Wall Street is another abstract setting, where post-IPO investors make judgments about Google's performance. The stock rises or falls on the opinions, hopes and fears of Wall

Street. This setting includes players who can bring pressure on Google to do things like restructure its management. Other companies have been forced to lay off or outsource large parts of their workforces in the hope that Wall Street will respond positively.

Language and Meaning

Generally, the author uses language to bring across ideas that readers unfamiliar with Silicon Valley jargon can understand. Technical points do not interfere with the flow of thought, and most jargon elements are explained. This is the author's first attempt at a full-length book, and he falls into a poor habit that new writers sometimes develop. He likes to use obscure terms for simple concepts, forcing readers to consult a dictionary or conduct Internet searches too often. Examples noted are lucre (money), cognoscenti (experts), portalitis (undefined jargon, unwanted portal traffic disease), river card (obscure allusion to Texas Hold-em poker), CPM (Cost Per M, where M is the Roman Numeral for one thousand), triumvirate (shared three-way leadership), pastiches (hodgepodges), coterie (group), excoriates (denounces), discursive (rambling) and inchoate (disorganized, incomplete). This use of language can be attributed to the author's journalistic experience with writing about Silicon Valley companies. The style lends itself to overstating the ordinary in an attempt to be geek-hip.

Structure

The book is structured in a wind-rewind chronological manner. Time references bounce between 1998 and 2005, which causes some confusion as to what happens first. This seems to be a compromise to allow for the chapter structures. Each chapter addresses a large part of the Google story, and jumping around time periods becomes necessary. An overall timeline might help the reader to keep track of events, and as is expected when chaos and growth intermingle in business, many events occur in parallel. The author's Database of Intentions idea sandwiches the book, being a primary element of the first and last chapters. As such, the Database of Intentions becomes not so much a primary element of the entire book as the author's suggestions regarding where search technology might go. The primary element, search's development and its impact on business and society, does follow a fairly straight line through the book.

Quotes

"Consider the Database of Intentions as rich data topsoil on an archaeological layering of technology that over the past half century or so has created the potential for an entirely new culture to emerge." Chapter 1, p. 6

"Google's PageRank algorithm is an example of analysis: it looks at the links on a page, the anchor text around those links, and the popularity of the pages that link to another page and factors them together to determine the ultimate relevance of a particular page to your query." Chapter 2, p. 22

"Another reason Yahoo succeeded was its sense of fun - a characteristic that would come to define not only Yahoo, but nearly every Internet company seeking the fickle approval of the Web public." Chapter 3, p. 61

"Larry Page and Sergey Brin both knew what they were getting into when they accepted admission into Stanford University's graduate school of computer science. Stanford's elite program is known worldwide for its heady mix of academic excellence and corporate lucre. Students don't come to Stanford just for the training. They come for the dream: to start a company, grow rich, make their mark on the history of technology, and maybe change the world." Chapter 4, p. 67

"Spend an afternoon with Bill Gross in the IdeaLab offices, and you'll get the sense that had he not created IdeaLab, he might have self-destructed." Chapter 5, p. 99

"According to some early insiders, the hiring process felt like the rush process at an exclusive fraternity house. (This was not entirely accidental. Google executives still compare Google's internal culture to the collegial atmosphere of an elite graduate school.)" Chapter 6, p. 131

"This is the magic of intent-based marketing - it shifts marketing dollars from the unknown to the knowable. As Tim Armstrong, VP of advertising at Google, puts it, 'search turns a cost center into a profit center.'" Chapter 7, p. 171

"For the rest of us, it's a good idea to check your name on Google, early and often. Given that just about everyone else you meet will be doing it anyway, it's just smart to get a picture of who you are in the world according to the index." Chapter 8, p. 193

"In engineering terms, fate is a mathematical proof. Your free will to chose [sic] this day or that for your IPO will, in the end, have nothing to do with your ultimate fate. This whole notion of tempting fate is a bagatelle created by men terrified of math: the result, in the end, is simply the result." Chapter 9, p. 226

"Think back to your first Google epiphany, or if you've been searching the Web for a while, your first AltaVista epiphany. Think about what that felt like - how all of a sudden

you realized the world was, quite literally, at your feet (or rather, your fingertips)."
Chapter 10, p. 279

Topics for Discussion

What would the Web be like without search? Would the Web have grown so much without search?

Discuss how two different personalities like Page and Brin work together better than if they worked alone.

The Stanford University encourages technical advancement and business creation. What might the results be if another university located elsewhere, possibly in an economically depressed area, does the same thing?

Try searches for the identical keywords on Google and Yahoo. How do the results differ? Explain why this is so in light of what the *The Search* reveals about Google and Yahoo.

Google embraces the motto to Do No Evil. What does this say about the Google corporate culture? How realistic is this motto?

Are the author's descriptions about how the world will change plausible? How will the changes be positive, negative or neutral?

Try searching your full name across the various search engines available on the Web. What are the results? What can one do to change the results?