

Benjamin Archer, Jessica Dunphy, Steven Carter, Ioana Ludwick, Mitchel Nosack, Aatif Qadeer
Arizona State University

Introduction

How does one define Google? Ironically, you can Google the answer. Currently, the top two results for the Google search “define:Google” are from Princeton’s WorldNet.edu Web site:

- (v) search the Internet (for information) using the Google search engine; “He googled the woman he had met at the party”; “My children are googling all day.”
- (n) a widely used search engine that uses text-matching techniques to find web pages that are important and relevant to a user’s search.¹

With less than thirteen years under its belt, Google has evolved from a graduate school project to join the ranks of Kleenex, Xerox, and Q-tip as a genericized word known throughout the world as a synonym for “Internet search.” Host to 70 percent of the worldwide Internet search market, it should come as no surprise that one’s Google page ranking is the yardstick against which most Internet companies are measured.

This success is due to Google consistently utilizing its competencies to challenge the strategies of the world’s leading technological innovators. This is a notable accomplishment considering the current global economic crisis crippling the economies of even developed nations and further emphasizes the codependent relationship of technology and globalization. When weighing the 2009 financial performances of Google’s competitors against each other as well as the market as a whole, Google has not only managed to hold its own, but to also take first place in the overall per share data and growth categories and take second place in overall profitability. Taken as a whole, its 2009 figures demonstrate that Google is giving its competitors a run for their money and their market share.

According to *New York Times* writer, John Markoff, Google’s competitive advantage is in its ability to “leverage the power of free.”² Add to that the idea that Google’s “innovations don’t stop at the desktop”³ and a way to define Google begins to emerge. Although its search and advertising services are still the heart and soul of Google, its desire to bring the world to within the reach of every consumer has initiated its move into Apps (applications) and mobile features and turned Google into an “inventor.”⁴ As Google ventures further into the growth phase of its life cycle and diversifies its business into new segments, the prominent challenges it faces include:

- Identifying the optimal mix of resources and capabilities needed to manage the growth of the Android mobile operating system
- The need for strategic action to handle the escalating situation in China without removing itself from that market
- Responding appropriately to amplified concerns over privacy to minimize the impact of those concerns on future operations

Google’s History

In 1996, Stanford students Larry Page and Sergey Brin created a web search engine called BackRub, later changed to Google (an intentional misspelling of googol, a word representing a number starting with a “1” and followed by one hundred zeros),⁵ and put into motion a series of events leading to the creation of what is now the world’s most used Web site.⁶

In 1998, Google incorporated and received its first investor funding of \$100,000.⁷ In the midst of the dot-com boom, new web startups were common and an informal but hardworking business style was almost universal. Google fit into this world quite naturally, hiring its first company chef in 1999 with only 40 employees.

Unlike most other web startups of the late 90s, however, and thanks to its advertising revenues, Google was able to maintain its profitability when the dot-com bubble later burst.⁸

In 2001, Google named Eric Schmidt Chairman of the Board of Directors and CEO. Co-founder Larry Page explained why Schmidt was a natural choice: "Eric is widely acknowledged as a brilliant technologist and savvy business leader. These qualities, combined with his entrepreneurial spirit, fit with Google's culture, making Eric the perfect addition to our board of directors."⁹

Also in 2001, Google made its first major foray into diversification when it purchased Deja.com, an acquisition that evolved to become Google Groups.¹⁰ Over the years, many other acquisitions followed, including Blogger (web blogging software), Picasa (a photo sharing Web site with photo editing software), Keyhole (satellite imagery software that became Google Earth and Google Maps), Writely (online document editing, to become Google Docs), and YouTube (video sharing), to name just a few.¹¹ These acquisitions enabled Google to leverage its capabilities in new ways and built the Google brand from one of a simple search engine company with a small set of leaders to the massive web enterprise it is today. In its present stage of development, Google has four major areas of focus: web search, advertising, apps, and mobile.

Web Search

*"Search is how Google began, and it's at the heart of what we do today."*¹²

Google's web search functionality is an indispensable feature of the Internet and recognized by Google as essential to its business. Programmers and engineers work constantly to make search results and page rankings as relevant as possible, devoting more time to it than any other Google product.¹³ Search is available in over 130 languages and Google owns over 160 localized country/regional domains.¹⁴

Advertising

*"You can make money without doing evil."*¹⁵

Advertising sales accounted for approximately 97 percent of Google's total revenues in 2008 and 2009.¹⁶ Balancing the necessity of ad revenue with consumers' distaste for ads, Google makes a concerted effort to keep ads unobtrusive, clearly marked as advertisements, and relevant to the end user's needs. For instance, searching for business schools will produce advertisements for online business schools and MBA school rankings. Similarly, advertisements in Gmail are based on the content of a user's sent and received email. A user who emails friends about a Las Vegas getaway

would likely see advertisements on Gmail for Las Vegas hotels and shows. Because users are more likely to find the ads relevant, click-through rates increase and advertisers receive a higher return on their investment.

Apps

*"We built Google Apps from the ground up for today's connected world."*¹⁷

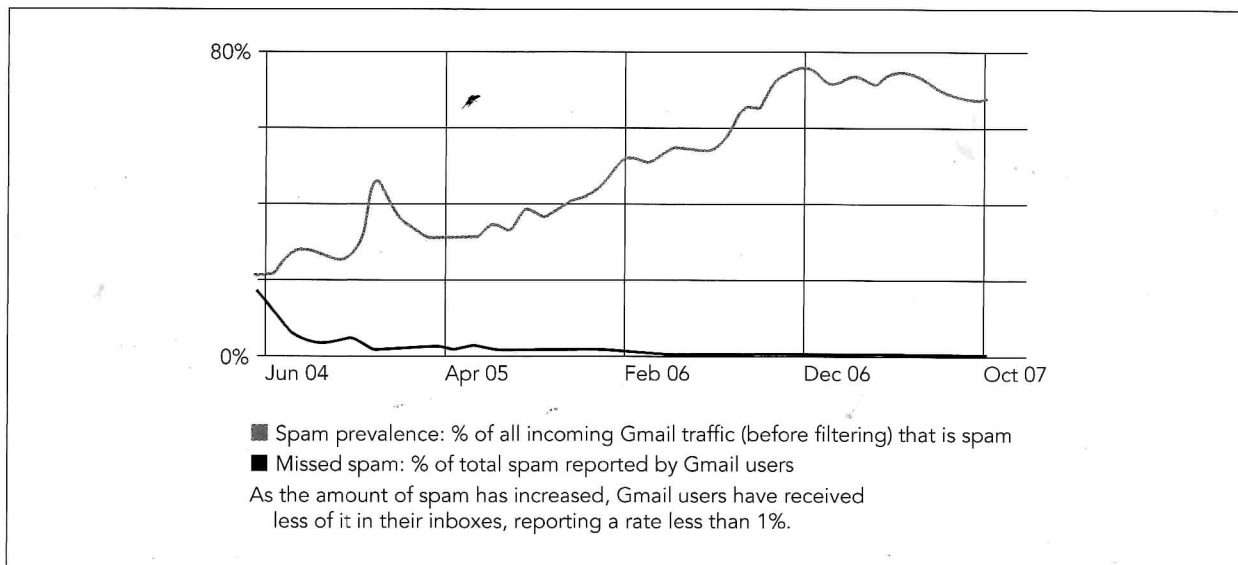
Google Apps is a suite of cloud computing tools comprised of many of the products of Google's acquisitions as well as a great deal of internal development. There are many systems within Google Apps, including:

- **Gmail**—Gmail changed the world of online email. At a time when most free email providers offered 10 MB of storage or less, Google announced free email with a 1 GB (and growing) storage limit. In addition, Gmail has advanced spam-filtering techniques that significantly reduce the amount of junk mail reaching a user's inbox. (Exhibit 1 illustrates the amount of spam Gmail users report receiving.)
- **Google Docs**—A suite of online editing tools encompassing word processing, spreadsheets, presentations, drawings, and forms. Generally, Google Docs is less feature-rich than full desktop applications such as Microsoft Office and Apple iWork; however, it offers the essential (and therefore most used) features of each application. Google Docs is available for use by anyone on any computer with a web browser. Easily the most attractive feature of Google Docs is users' ability to share documents with anyone with an email address, thus allowing for simultaneous live editing by multiple users.
- **Google Calendar**—An online calendar system that allows for online and mobile access, synchronization to many applications and mobile devices, event reminders via email and SMS, and easy calendar sharing with friends and coworkers.
- **Other Google Apps** include Orkut (social networking), Picasa (photo editing, cataloging, and sharing), Reader (RSS/news feed reader), Sites (Web site creation), SketchUp (computer-aided design and 3D modeling), Talk (instant messaging with voice and webcam chat), and YouTube (video sharing).

Mobile

*"You don't need to be at your desk to need an answer."*¹⁸

Mobile computing is widely regarded as the future of the Internet and Google embraced mobile technology from the start. Google has mobile search and mapping apps as well as other apps including YouTube and Buzz for many smartphones.

Exhibit 1 Gmail Spam Rates

Source: Gmail by Google. <http://www.google.com>

Google's largest contribution to the mobile world however was leading in the creation of the Open Handset Alliance (OHA): a collection of 71 technology and mobile companies responsible for creating the first full, open-source, and freely available mobile phone operating system called Android. Android is also a player in the growing world of portable tablet computing, competing with Apple's iPad.

Strategic Leadership

Google would not exist as it does today if not for the work of its leaders. Google's 2009 annual report states, "Our future success depends in a large part upon the continued service of key members of our senior management team. In particular, our CEO, Eric Schmidt, and our founders, Larry Page and Sergey Brin, are critical to the overall management of Google as well as the development of our technology, our culture, and our strategic direction."¹⁹ Since 2005, all three executives have been offered a market-competitive annual salary and each year they decline, instead receiving an annual base salary of \$1.²⁰ Of course, their equity in the company is worth a very large sum. Despite differing titles, the triumvirate share responsibility for determining strategy and running Google.

Dr. Eric Schmidt: Chairman of the Board and CEO

Schmidt joined Google in 2001 as Chairman of the Board of Directors and Google quickly named him CEO. His prior experience included CEO/Chairman of Novell Inc., Chief Technology Officer for Sun Microsystems, and researcher at Xerox's Palo Alto Research Center—the birthplace of much of modern computing, including graphical user interfaces for personal computers (PCs).²¹

Schmidt also served on the board of directors of Apple from 2006 until 2009 at which point he resigned due to increased conflict of interest as Google and Apple began to compete head-to-head in more business segments with the introductions of Android and Chrome OS.²² Schmidt is one of 21 members of the President's Council of Advisors on Science and Technology (PCAST), an "advisory group of the nation's leading scientists and engineers who directly advise the President and the Executive Office of the President."²³

Larry Page: President of Products

Co-founder Larry Page was Google's first CEO and served until 2001 when he became President of Products. His father, a computer science professor at Michigan State University, exposed Page to computers at a very young age thus seeding a passion that never let go. He holds a bachelor's degree in computer engineering, a master's degree in computer science and, during his Ph.D. studies at Stanford, met Sergey Brin and developed Google's prototype, BackRub.²⁴

Sergey Brin: President of Technology

Similar to Page's upbringing with computers, co-founder Sergey Brin's father and grandfather were both mathematicians. Born in Moscow, he came to the US at a young age and later double-majored and graduated with honors as an undergraduate in mathematics and computer science. He also holds a master's degree in computer science from Stanford.

Brin and Page are seldom mentioned individually and are often called the "Google guys." To those that know them, it seems that since the BackRub project began they have been inseparable. Withdrawing prior to

completing the program, Stanford considers both Brin and Page to be “on leave” from their Ph.D. studies, placing what some might deem “their future” on hold.

The World of Google

Overview of Industry

The competitive industries that Google operates in cannot be classified by using only one or two NAICS (North American Industry Classification System) or SIC (Standard Industrial Classification) codes: its diversified portfolio spans a wide array of products and services all revolving around the opportunities brought on by the advent of the Internet. Similarly, it would be extremely shortsighted to discuss only the aspects of Google's strategy related to its most notable offerings—Web Search and Advertising.

For these reasons, an “overview of Google's industry” is better achieved by an examination of the key competitors Google faces across the spectrum of its offerings. Those competitors include Yahoo!, Microsoft, and Apple. These companies are diversified to include several industries with the common goal of each company to provide innovative products and services that provide consumers with the ability to access, disseminate, create, and use computer data.

To fully appreciate the intensity of the rivalry that exists to provide innovative capabilities to consumers between the four key players identified, the following is a discussion—including historical background information and 2009 financial performance data—of Google's competitors.

Yahoo! Inc. In 1994, Jerry Wang and David Flo, Stanford University students, created Yahoo! when they developed “an Internet bookmark list and directory of interesting sites.”²⁵ (If this sounds familiar, remember that just two years later, Google was started by two Stanford students

as well.) In 2000, Yahoo! formed a partnership that allowed Google to power Yahoo!'s organic results thus effectively introducing “their largest competitor to the world,” making Google “a household name” and, in the process, cutting its own throat.^{26, 27}

Within five years, Google was outperforming Yahoo! and by 2009, had captured 70 percent of the search engine market share.²⁸ Yahoo! ended 2009 with a market capitalization value of \$21.4 billion, sales of \$6.5 billion, and net income of \$598 million: 14 percent, 27 percent, and 9 percent of Google's respective key figures. (Exhibits 2 and 3 provide segment performance and expenditures information for Yahoo!.)

Yahoo!'s vision is “to be the center of people's online lives by delivering personally relevant, meaningful Internet experiences.” The company focuses on four categories that offer Yahoo! users the opportunity to turn the Internet into a unique and personal online portal by displaying specific content, pages, and applications chosen by the user. These categories include:²⁹

- Integrated Consumer Experiences—contains the personalized Yahoo! Home Page, MyYahoo!, Yahoo! Toolbar, Yahoo! Local, and Connected TV
- Applications (Communications and Communities)—includes Yahoo! Mail, Yahoo! Messenger, Yahoo! Groups, Yahoo! Answers, and Flickr
- Search—Yahoo!'s proprietary search technology via Yahoo! Search
- Media Products & Solutions—home to Yahoo! News, Yahoo! Finance, Yahoo! Sports, Yahoo! Entertainment & Lifestyles (including Yahoo! Movies, Yahoo! Music, Yahoo! TV, omg!, Yahoo! Games, and Shine), Yahoo! Health, Yahoo! Tech, Yahoo! Education, Yahoo! Weather, Yahoo! Shopping, Yahoo! Travel, Yahoo! Real Estate, Yahoo! HotJobs, Yahoo! Personals, Yahoo! Autos, and Yahoo! Small Business

Exhibit 2 Yahoo! 2009 10-K Filing Data

YAHOO! Inc. Year Ended December 31,					
SALES BY OPERATING SEGMENT (in millions)	2007	2008	% Change from 2007	2009	% Change from 2008
Marketing services:					
Owned and Operated sites	3,670	4,046	10%	3,553	-12%
Affiliate sites	2,419	2,270	-6%	2,121	-7%
Marketing services	6,088	6,316	4%	5,674	-10%
Fees	881	892	1%	787	-12%
Total Sales \$	6,969	7,209	3%	6,460	-10%
SALES BY MAJOR GEOGRAPHIC AREAS (in millions)	2007	2008	% Change from 2007	2009	% Change from 2008
United States	4,724	5,182	10%	4,714	-9%
International	2,245	2,026	-10%	1,746	-14%
Total Sales \$	6,969	7,209	3%	6,460	-10%

(Continued)

Exhibit 2 Yahoo! 2009 10-K Filing Data (Continued)

YAHOO! Inc. Year Ended December 31,					
SALES BY OPERATING SEGMENT (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
Marketing services:					
Owned and Operated sites	53%	56%	3%	55%	-1%
Affiliate sites	35%	31%	-3%	33%	1%
Marketing services	87%	88%	0%	88%	0%
Fees	13%	12%	0%	12%	0%
Total Sales %	100%	100%	0%	100%	0%
SALES BY MAJOR GEOGRAPHIC AREAS (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
United States	68%	72%	4%	73%	1%
International	32%	28%	-4%	27%	-1%
Total Sales %	100%	100%	0%	100%	0%

Source: Securities and Exchange Commission

Exhibit 3 Yahoo! Expenses: 2007 to 2009

YAHOO! (In millions, except percentages)			
	2007	2008	2009
Research and development expenses	\$1,084	\$1,222	\$1,210
as a Percentage of Sales	16%	17%	19%
Sales and marketing expenses	\$1,610	\$1,563	\$1,245
as a Percentage of Sales	23%	22%	19%
General and administrative expenses	\$ 633	\$ 705	\$ 580
as a Percentage of Sales	9%	10%	9%

Source: Securities and Exchange Commission

With the near impossible task of catching up to Google, in the summer of 2009, Yahoo! partnered with Microsoft to provide worldwide sales support for premium search advertisers in exchange for Microsoft's platform technology services. In the short term, Yahoo! stands to profit from the agreement, receiving 88 percent of net revenues generated. However, by handing Microsoft an exclusive 10-year license to its core search technology as well as permission to integrate this technology into its existing web search platforms, only time will tell whether, in its determination to beat Google, Yahoo! has once again helped a competitor more than it helped itself.³⁰

Microsoft Corp. In December 1974, Bill Gates and high school friend Paul Allen were introduced to the world's first PC—the Altair 8800—via a *Popular Electronics* magazine article. Recognizing the potential and given the green light from its developer, Gates and Allen went to work developing BASIC, the programming language for the Altair. They named their company Micro Soft, which they subsequently trademarked as Microsoft in November of 1976.³¹

By 1978, Microsoft's revenues surpassed the \$1 million mark and in 1980, Bill Gates recruited his old

friend from Harvard, Steve Ballmer, as Microsoft's first business manager. This led to the licensing of MS-DOS in 1980 and the incorporation of Microsoft in 1981. By the end of 1983, the company was well on its way to earning hundreds of millions of dollars. As if that weren't enough, in 1985, Microsoft permanently changed the face of the PC industry with its release of Microsoft Windows.³²

Today, Microsoft is "the worldwide leader in software, services, and solutions that help people and businesses realize their full potential."³³ Its corporate strategy revolves around the following five business segments with each segment responsible for the development and marketing of all products within its segment:

- Windows and Windows Live—products include all versions of Windows 7, Windows Vista, Windows XP Home, and Windows Live
- Server and Tools—server software, software developer tools, services, and solutions including Windows Server OS, Windows Azure, Microsoft SQL Server, SQL Azure, Visual Studio, Silverlight, System Center products, Biz Talk Server, Microsoft Consulting Services, and Premier product support services

- Online Services—including Bing, Microsoft adCenter, MSN, and Atlas online tools for advertisers and publishers
- Microsoft Business—product line includes Microsoft Office, Microsoft SharePoint, Microsoft Dynamics ERP and CRM, and Microsoft Office Web Apps
- Entertainment and Devices—the only division also responsible for the production of its products, this segment offers Xbox 360 console and games, Xbox LIVE, Windows Phone, Windows Embedded device OS, Zune, Mediaroom, Windows Automotive, as well as branded hardware products including mice, keyboards, etc.³⁴

With subsidiaries in 109 countries and 2009 figures that include a market capitalization value of \$235.2 billion, sales of \$58.4 billion, and net income of \$14.6 billion (165 percent, 243 percent, and 219 percent of Google's respective key figures), it is apparent that Microsoft is an enormous presence in the technology industry across all operating segments and—with product offerings in four of its five segments (Server and Tools excepted) that directly rival Google offerings—an enormous competitor of Google. (See Exhibit 4 for an income statement as well as a financial summary by segment for Microsoft.)

Exhibit 4 Microsoft 2009 10-K Filing Data

MICROSOFT Corp. Year Ended June 30,					
SALES BY OPERATING SEGMENT (In millions)	2007	2008	% Change from 2007	2009	% Change from 2008
Client	14,779	16,472	11%	14,414	-12%
Server and Tools	11,117	13,121	18%	14,135	8%
Online Services Business	2,434	3,190	31%	3,088	-3%
Microsoft Business Division	16,478	18,935	15%	18,902	0%
Entertainment and Devices Division	6,136	8,213	34%	7,753	-6%
Unallocated and other	178	489	175%	145	-70%
Total Sales \$	51,122	60,420	18%	58,437	-3%
SALES BY MAJOR GEOGRAPHIC AREAS (In millions)	2007	2008	% Change from 2007	2009	% Change from 2008
United States	\$ 31,346	\$ 35,928	15%	33,052	-8%
Other countries	19,776	24,492	24%	25,385	4%
Total Sales \$	\$51,122	\$60,420	18%	58,437	-3%
MICROSOFT Corp. Year Ended June 30,					
SALES BY OPERATING SEGMENT (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
Client	29%	27%	-2%	25%	-3%
Server and Tools	22%	22%	0%	24%	2%
Online Services Business	5%	5%	1%	5%	0%
Microsoft Business Division	32%	31%	-1%	32%	1%
Entertainment and Devices Division	12%	14%	2%	13%	0%
Unallocated and other	0%	1%	0%	0%	-1%
Total Sales %	100%	100%	0%	100%	0%
SALES BY MAJOR GEOGRAPHIC AREAS (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
United States	61%	59%	-2%	57%	-3%
Other countries	39%	41%	2%	43%	3%
Total Sales %	100%	100%	0%	100%	0%

Source: Securities and Exchange Commission

Apple Inc. Apple Inc.'s founders, Steve Wozniak, Steve Jobs, and Ron Wayne were reading the same magazines as Bill Gates and Paul Allen in early 1975 and founded Apple Computer Company in April 1976.³⁵ Taking the hardware rather than software approach of Microsoft, Apple has been defined by a very volatile history of industry highs and lows and, despite their different strategies, has been largely shaped by its lifelong competition with Microsoft.

The leadership presence of Jobs, who was ousted from the company in 1985 and returned in 1997, is the undeniable driving force behind Apple's most recent and longest lasting resurgence. Jobs envisioned the future market of several important product lines that would utilize the Mac as the "hub of [the consumer's] digital lifestyle."³⁶ Jobs realized his vision with breakthrough products that drive the company's financial success today including iTunes, the iPod, and the iPhone.

Apple bases its operations primarily on geographic segments rather than individual subsidiaries: users' ability to access customized language pages on its Web site by choosing from approximately 105 different countries/regions illustrates Apple's worldwide presence.³⁷ Apple's business strategy revolves around its commitment "to bringing the best personal computing, mobile communication, portable digital music, and video experience to consumers, students, educators, businesses, and government agencies through its inno-

vative hardware, software, peripherals, services, and Internet offerings."³⁸ Its product offerings are broken out between Mac and iPod with subcategories defined as follows:³⁹

- Mac Desktops—products include iMac, Mac mini, Mac Pro, and Xserve
- Mac Portables—including the MacBook, MacBook Air, and MacBook Pro product lines
- Music related products and services—inclusive of iTunes Store sales, iPod services, as well as Apple-branded and third-party iPod accessories
- iPhone and related products and services—comprised of handset sales, carrier agreements, and both Apple-branded and third-party iPhone accessories
- Peripherals and other hardware—display sales, wireless connectivity, networking solutions, and other hardware accessories
- Software, service, and other sales—sales of Apple-branded operating systems and application software, third-party software, AppleCare, and Internet services

As of the end of September 2009, Apple's financial performance placed it second to Microsoft with a market capitalization value of \$220.5 billion, sales of \$36.5 billion, and net income of \$5.7 billion—143 percent, 152 percent, and 85 percent of Google's respective key figures (see Exhibit 5 for Apple's sales broken out by operating segments and geography).

Exhibit 5 Apple 2009 10-K Filing Data

APPLE Inc. Year Ended September 26,					
SALES BY OPERATING SEGMENT (in millions)	2007	2008	% Change from 2007	2009	% Change from 2008
Desktops	4,020	5,603	39%	4,308	-23%
Portables	6,294	8,673	38%	9,472	9%
Total Mac net sales	10,314	14,276	38%	13,780	-3%
iPod	8,305	9,153	10%	8,091	-12%
Other music related products and services	2,496	3,340	34%	4,036	21%
iPhone and related products and services	123	1,844	1399%	6,754	266%
Peripherals and other hardware	1,260	1,659	32%	1,470	-11%
Software, service and other sales	1,508	2,207	46%	2,406	9%
Total net sales	24,006	32,479	35%	36,537	12%
SALES BY MAJOR GEOGRAPHIC AREAS (in millions)	2007	2008	% Change from 2007	2009	% Change from 2008
Americas net sales	11,596	14,573	26%	16,142	11%
Europe net sales	5,460	7,622	40%	9,365	23%
Japan net sales	1,082	1,509	39%	1,831	21%
Retail net sales	4,115	6,315	53%	6,574	-4%
Other Segments net sales	1,753	2,460	40%	2,625	7%
Total net sales	24,006	32,479	35%	36,537	12%

(Continued)

Exhibit 5 Apple 2009 10-K Filing Data (Continued)

APPLE Inc. Year Ended September 26,					
SALES BY OPERATING SEGMENT (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
Desktops	17%	17%	0%	12%	-5%
Portables	26%	27%	1%	26%	-1%
Total Mac net sales	43%	44%	1%	38%	-6%
iPod	35%	28%	-7%	22%	-6%
Other music related products and services	10%	10%	0%	11%	1%
iPhone and related products and services	1%	6%	5%	18%	12%
Peripherals and other hardware	5%	5%	0%	4%	-1%
Software, service and other sales	6%	7%	1%	7%	0%
Total Sales %	100%	100%	0%	100%	0%
SALES BY MAJOR GEOGRAPHIC AREAS (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
Americas net sales	48%	45%	-3%	44%	-1%
Europe net sales	23%	23%	0%	26%	3%
Japan net sales	5%	5%	0%	5%	0%
Retail net sales	17%	19%	2%	18%	-1%
Other Segments net sales	7%	8%	1%	7%	-1%
Total Sales %	100%	100%	0%	100%	0%

Source: Securities and Exchange Commission

On May 26, 2010, *The New York Times* reported that, "Wall Street has called the end of an era and the beginning of the next one: The most important technology product no longer sits on your desk but rather fits in your hand. Apple Passes Microsoft as No. 1 in Tech."⁴⁰ Three quarters of the way into its 2010 fiscal year, Apple's posted market capitalization increased from \$220.5 billion to \$222.12 billion while, one month shy of the end of its fiscal year, Microsoft's market capitalization value fell from \$235.2 billion to \$219.18 billion.⁴¹ And with that, the apple upset the cart.⁴²

Firm-Specific Industry Highlights

All four firms are Internet-related technological frontrunners. To succeed in an industry where obsolescence can occur with the click of a mouse, innovation is the key not

only to survival, but to success as well.⁴³ To stay ahead of the competition, research and development as well as the ability to market and sell products and services is vital.

To tackle the first of these requirements, Google spends the majority of its operating expense dollars on research and development. As for the second, anyone that looks at the source of its revenue can determine that Google is in the business of advertising. Coupled with the fact that its products and services are virtual—thus limiting its cost of sales by reducing labor, production, warehousing, and distribution costs—it is not necessary for Google to spend a significant amount on sales and marketing (see Exhibit 6 for an overview of Google's expenses).

On the other hand, because Microsoft sells physical goods in addition to its virtual offerings as well as the fact it must now defend its market position, Microsoft spends

Exhibit 6 Google Expenses: 2007 to 2009

GOOGLE			
(in millions, except percentages)	2007	2008	2009
Research and development expenses	\$2,120	\$2,793	\$2,843
as a Percentage of Sales	13%	12.8%	12%
Sales and marketing expenses	\$1,461	\$1,946	\$1,984
as a Percentage of Sales	8.8%	8.9%	8.4%
General and administrative expenses	\$1,279	\$1,803	\$1,667
as a Percentage of Sales	7.7%	8.3%	7%

Source: Securities and Exchange Commission

Exhibit 7 Microsoft Expenses: 2007 to 2009

MICROSOFT			
<i>(In millions, except percentages)</i>	2007	2008	2009
Research and development expenses	\$ 7,121	\$ 8,164	\$ 9,010
as a Percentage of Sales	14%	14%	15%
Sales and marketing expenses	\$11,541	\$13,260	\$12,879
as a Percentage of Sales	23%	22%	22%
General and administrative expenses	\$ 3,329	\$ 5,127	\$ 3,700
as a Percentage of Sales	7%	8%	6%

Source: Securities and Exchange Commission

heavily on both sales and marketing (see Exhibit 7). Because Microsoft largely relies on the success and widespread use of its Windows and Office products and makes only incremental innovations, it has to work harder to sell new products and services. However, as Google moves into Microsoft's software market with Google Apps, rather than defend this heavily fortified position, Microsoft is instead looking to take a bite out of Google's online search market and feels its partnership with Yahoo! is the means to achieve this goal.

Despite having no physical goods, Yahoo!'s research and development, marketing, and sales expenditures have largely mirrored those of Microsoft rather than that of Google. In recent years, Yahoo! has made incremental increases to its research and development budget that are nearly directly offset by decreases to its sales and marketing budget, a shift made possible by their partnership with Microsoft.

As has been its strategy and style from the beginning, Apple's approach and a possible key to its success lies in its ability to market itself through a "digital lifestyle" that touts its products as highly desirable, premium offerings as well as "a culture of secrecy, marketing capability, brand image, and Steve Jobs."⁴⁴ Validating the secrecy aspect and as seen in Exhibit 8, Apple does not differentiate its sales and marketing costs from its general and administrative expenses. Adding to the mystique,

viewed as a percentage of sales, Apple's research and development expenses consistently run an average of 10 percent less than that of its competitors. In true Apple form, instead of providing insight, Apple's financial disclosures seem to create more questions.

Together, these four companies illustrate varying degrees of diversification, but each remains under the related technology umbrellas of computing applications and use of the Internet. Associated technological trends necessary to remain competitive are explored next.

The Global Impact of Technology

In the Internet Age, ever-changing technology rules the domain. As recently as just two decades ago, the Internet was in the "early adopters" stage with the average consumer experiencing personal computing for the first time.⁴⁵ By the end of 2009, there were 1.8 billion Internet users worldwide with an impressive 40 percent of those users residents of undeveloped or third world nations.⁴⁶ As the exponential pace of technological advancement continues to render yesterday's innovations obsolete, companies competing in an industry relying on the Internet will find that, without the proper investment in infrastructure, no amount of innovation will keep them ahead of the competition. The technologies necessary to ensure the viability of a firm in this industry include server hardware, storage, and bandwidth.

Exhibit 8 Apple Expenses: 2007 to 2009

APPLE			
<i>(In millions, except percentages)</i>	2007	2008	2009
Research and development expenses	\$782	1,109	1,333
as a Percentage of Sales	3%	3%	4%
Sales and marketing expenses ⁽¹⁾	—	—	—
as a Percentage of Sales	—	—	—
General and administrative expenses	2,963	\$3,761	\$4,149
as a Percentage of Sales	12%	12%	11%

⁽¹⁾ Included as "Selling Expense" in the "General and administrative expenses" line

Source: Securities and Exchange Commission

Server Hardware. Many companies offer server hardware including HP, Dell, IBM, and Sun. Platform compatibility and comparable specifications make server hardware a commodity to large businesses. Interestingly, Google does not purchase servers but instead, builds its own. The Gartner Group, an information technology research and advisory firm, estimated in 2006 that Google has become the fourth largest server manufacturer in the world saying, "They are building an enormous computing resource on a scale that is almost unimaginable."⁴⁷

Storage. For most large-scale web companies, storage space is a significant investment. Most companies use large storage arrays: single devices that hold many high-performance drives that generally include redundancy to handle drive failures. These devices, and the drivers inside them, come at a cost significantly higher than standard desktop computer storage. As with server hardware, Google does not follow the norm, instead adopting a low-price, high-redundancy model where individual drives are very inexpensive and are expected to fail.⁴⁸ Exact details of Google's configurations, however, are a closely held trade secret.

Bandwidth. Transferring data over the Internet has a cost, in the form of bandwidth. Internet service providers (ISPs) generally charge based on the amount of data transferred; however, information on how much very large firms pay for bandwidth is tightly controlled. It is widely suspected that Google pays very little for bandwidth due to its large-scale purchases of "dark fiber"—fiber optic cable laid in the dot-com heyday but since left unused.⁴⁹

To say that Google's entire basis for operations depends upon the Internet's existence and functionality is not an exaggeration. Additionally, with advertising providing 97 percent of Google's revenues and with approximately 47 percent of that revenue attributed to US sales (see Exhibit 9), it is no surprise that Google aspires to "change the competitive landscape of broadband America."⁵⁰ To do so, it is focusing its capital resources into the development of "ultra-fast fiber networks it plans to start rolling out in the near future."⁵¹

In addition to the fixed fiber optic connection challenges, the demand for wireless connectivity presents a completely separate host of issues. Between year-end 2008 and year-end 2009, the amount of data transfers that occurred via mobile computing grew an astounding 158 percent. The growth within this segment has been so significant over the past five years that mobile providers are struggling to catch up and expectations

are that the growth of this segment's bandwidth needs will outpace that of desktop computing within the very near future. The introduction of appealing mobile computing devices such as Android-based devices, the iPhone, iPad, and connected iPods, have wireless providers rethinking the flat-rate plans—initially offered to entice wary users—that dominate this segment. Google's entry into this market has already caused one of the world's largest mobile operators, Telefonica, to consider charging Google and "other big Internet firms" for access to its network. With mobile data traffic expected to increase to 39 times its present rate within the next five years, network providers are seeking ways to monetize this segment and, consequently, the cost of doing business for Internet-based companies, including Google, will rise.⁵²

The sum of 4.6 billion worldwide mobile subscriptions and 1.8 billion worldwide Internet users equals what one computer scientist at the University of California in Berkeley coined to be "the industrial revolution of data."⁵³ With increases in mobile computing, the demand for digital global storage has outpaced supply since 2007. This fact makes the discussions of cloud computing—virtual data warehouses with enormous capacity that store data via the Internet—that upstaged Office 2010 at its own launch party a bit more understandable.⁵⁴

According to data provided by Euromonitor International, despite the global financial crisis that created economic volatility in virtually all markets and defined the economic climate for the past three years,⁵⁵ since 2004, the number of worldwide Internet users has increased 93 percent with the majority of that growth happening in emerging markets, particularly in the Middle East/Africa and Asia Pacific geographic regions. According to Millward Brown Optimor, a consultancy that issues annual reports aimed at measuring the intangible value of brand names to the companies that own them, as of April 2010, Google, Apple, and Microsoft were in three of the top four spots.⁵⁶ With the growing relevance of consumers and Internet users in emerging markets, global macroeconomic factors can affect these companies almost as much as the changes in technology previously discussed.

Strategies Used

Google's competitive environment is extremely complicated as it involves different industries and markets, each with its own set of competitors and challenges. As briefly discussed previously, Google's main areas of focus are Search, Advertising, Apps, and Mobile.

Exhibit 9 Google 2009 10-K SEC Filing Data

GOOGLE Inc. Year Ended December 31,					
SALES BY OPERATING SEGMENT (in millions)	2007	2008	% Change from 2007	2009	% Change from 2008
Advertising revenues:					
Google web sites	\$10,625	\$14,414	36%	\$15,722	9%
Google Network web sites	5,788	6,715	16%	7,166	7%
Total advertising revenues	16,413	21,129	29%	22,889	8%
Licensing and other revenues	181	667	268%	762	14%
Total Sales \$	16,594	21,796	31%	23,651	9%
SALES BY MAJOR GEOGRAPHIC AREAS (in millions)	2007	2008	% Change from 2007	2009	% Change from 2008
United States	8,698	10,636	22%	11,194	5%
United Kingdom	2,531	3,038	20%	2,986	-2%
Rest of the world	5,365	8,122	51%	9,471	17%
Total Sales \$	16,594	21,796	31%	23,651	9%
GOOGLE Inc. Year Ended December 31,					
SALES BY OPERATING SEGMENT (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
Advertising revenues:					
Google web sites	64%	66%	2%	66%	0%
Google Network web sites	35%	31%	-4%	30%	-1%
Total advertising revenues	99%	97%	-2%	97%	0%
Licensing and other revenues	1%	3%	2%	3%	0%
Total Sales %	100%	100%	0%	100%	0%
SALES BY MAJOR GEOGRAPHIC AREAS (in % of Total Sales)	2007	2008	% Change from 2007	2009	% Change from 2008
United States	52%	49%	-4%	47%	-1%
United Kingdom	15%	14%	-1%	13%	-1%
Rest of the world	32%	37%	5%	40%	3%
Total Sales %	100%	100%	0%	100%	0%

Source: Securities and Exchange Commission

Search

Page and Brin's original data indexing algorithms were the start of Google's success and Google's search capabilities have only gotten better as the two continue their pursuit of the most perfectly intuitive Internet search. In the words of Larry Page: "The perfect search engine would understand exactly what you mean and give back exactly what you want. When the dot-com boom exploded and competitors spent millions on marketing campaigns to "build brand," Google focused instead on quietly building a better search engine."^{57,58}

Google adopted several key areas of search comprehensiveness and relevance in which it seeks continuous

advancements: objectivity, global access, ease of use, pertinent and useful commercial information, multiple access platforms, and improving the web.⁵⁹ As Google grew, it increased its capital expenditures to target these key areas and others including satellite imaging. The effect of this spending resulted in a solid infrastructure, better products, increased traffic, appeal for advertisers, and what is most likely a standard unreachable by competitors.⁶⁰

Advertising

With its single overarching strategy in advertising sales to deliver cost-effective, targeted, relevant ads that are useful to the end user, advertising dollars

provide 97 percent of Google's revenue. In the Google world, "Ads are information and complement search results."⁶¹

AdWords and AdSense are the two main advertising products of Google. AdWords allows advertisers to target their ads to user searches for specific topics and/or geographic regions. This provides advertisers with a very targeted, cost-effective, and successful method of advertising and provides users with ads that are relevant to where they are and what they are interested in at that moment. To get on board, advertising customers bid in an auction format to have their ads appear next to search results for certain keywords.⁶² Google's second advertising product, AdSense, allows Web site owners to share in the revenue generated by click-through traffic from Google ads placed on their site that are targeted to users based on the content of their site. AdSense has become an easy and common way for companies and individuals to generate revenue through their Web sites.

When an advertiser pays Google to show you an ad, Google believes you have the right to know and that it has an ethical responsibility to tell you. Because of this, Google differentiates ads from other content with a "sponsored links" or "Ads by Google" label. In addition, ad placements are not available for sale inside search results and advertisers cannot pay a premium for a higher ranking inside a search. These strategies benefit the user greatly as ads do not clutter actual search results. Google also makes tracking advertising more measureable and efficient for advertisers by offering tools like Google Analytics, Website Optimizer, Insights for Search, and Ad Planner.

Apps

Google Apps, including Gmail and YouTube, exist to improve the web for users and provide another avenue for advertising. Google offers apps like Gmail free for personal and educational use, with a nominal fee for business use, to offer additional functionality to users, improve their web experience, and ultimately, to generate goodwill for Google. While some apps do not contain ads (such as Google Docs and Picasa), several of them do. Gmail, for instance, serves up context-relevant ads based on the content of recent emails.

Google recently launched the Google Apps Marketplace, similar to the Android Market except specifically for web applications that integrate seamlessly with other Google Apps. The Marketplace is the first viable platform for cloud computing from third parties. This works well for increasing utilization of the Google Apps platform because, in the words of Google, "we certainly can't and won't do it all, and there are hundreds of business applications for which we have no particular

expertise."⁶³ Bringing third parties in strategically fills this gap and offers more functionality without dedicating Google's resources to creating applications outside its expertise.⁶⁴ Google collects 20 percent of the revenue generated by the third-party applications without spending any additional resources of its own. In exchange, app developers are integrated with Google products that are a core part of many users' lives and gain access to a huge audience. Due to the immense computing power offered by Google and low costs for both parties, this approach is virtually limitless.

Cloud computing is the centerpiece of Google's 2010 strategy. Schmidt told CNBC, "It's a new model. You basically put all your information on servers and you have fast networks and lots of different kinds of PCs and mobile phones that can use the applications . . . it's a powerful model and it's where the industry is going. It is the centerpiece of our 2010 strategy."⁶⁵

What is Google's cloud? It's a network made of, by some estimates, one million inexpensive servers, each not much more powerful than the PCs in our homes. This network stores huge amounts of data including multiple mirrors, or copies, of the World Wide Web. This makes search faster, helping find answers to billions of queries in a fraction of a second. However, unlike many traditional supercomputers, Google's system doesn't get old. When an individual server dies, usually after about three years, a newer and faster one replaces it. This means the cloud regenerates its computing power and capacity as it grows.⁶⁶

Mobile

Google's strategy in the mobile market has been a remarkable success as evidenced by the rapid growth in Android-enabled handsets in the past year. There are two main components to Google's mobile strategy: free, rich feature offerings and distribution of the operating system to handset manufacturers for free or, as explained later, less than free.⁶⁷

Android has made a dramatic push in market share by matching and often surpassing competitors' features. Apple's iPhone 3G offers a touch screen, accelerometer, app store, GPS, compass, video camera, and voice recognition.⁶⁸ The Motorola Droid, a flagship Android device competing with the iPhone, offers all of these same features plus a QWERTY keyboard and multitasking.⁶⁹

Apple recently announced that the iPhone would not support Adobe Flash, a major component of rich media on the Internet. Android, however, has announced that its next software upgrade will support not only Flash, but more advanced Microsoft Exchange features as well.^{70,71} In what may be Android's most "killer app," turn-by-turn GPS navigation is also available free through Google Maps. Turn-by-turn navigation has

historically required access to proprietary databases maintained by GPS companies; however, Google makes it available free on Android (immediately causing stocks for GPS companies Garmin and TomTom to drop 16 percent and 21 percent, respectively).

Android is an open-source operating system meaning it is free for anyone to use and modify as needed. If that was not reason enough for handset and tablet manufacturers to use it, Google also shares advertising revenues with manufacturers using Google's Apps pack. In other words, instead of paying licensing fees for phone operating systems, manufacturers are instead paid to use Android. This "less-than-free" business model is a new concept in the mobile device world and will likely change the game significantly.⁷²

Strategic Challenges

To help summarize, three major challenges in Google's immediate future are examined (these may not be exhaustive as its competitive landscape is continually evolving): managing the growth of Android, handling the escalating situation in China, and responding to the increasing customer concerns over privacy.

Android

Android is the name of the mobile phone operating system developed by the OHA, a movement led by Google to create a standard, open-source, free platform for mobile devices. Android was developed to compete directly with Apple's iPhone and Microsoft Windows Mobile. Google, like Apple, has an online mobile application store where users can purchase third-party software.

Open Handset Alliance (OHA). In late 2007, Google led in the creation of the OHA, an alliance originally formed by an impressive 65 member companies (now more than 80) that all agreed to the development and endorsement of a standard mobile device platform called Android. OHA member companies continue to represent a wide range of industries including mobile device manufacturers like Motorola and HTC, service providers such as T-Mobile and Sprint Nextel, semiconductor companies including Intel and NVidia, software companies such as Accenture and Wind River, and commercialization companies including eBay and NXP.⁷³

The "first joint project" of the OHA was to create Android, which "was built from the ground up with the explicit goal to be the first open, complete, and free platform created specifically for mobile devices."⁷⁴

Android has enjoyed unprecedented growth in the mobile arena. Gartner trends as of Q1 2010 showed that Android device shipments increased to 9.6 percent of

smartphones, compared to just 1.6 percent in Q1 2009.⁷⁵ In fact, by year-end 2010, Android had catapulted to the number two spot on Gartner's worldwide smartphone sales to end users by operating system statistics laying stake to 22.7% of market share.

While Apple has very stringent controls on the software available for sale in the iPhone App Store, offering applications for sale in Google's Android Market requires no prior approval. Google also has far fewer controls on allowable software, provided they do not violate the Android Developer Distribution Agreement.

Launched in October 2008, the number of apps available via Android Market has experienced exponential growth, surpassing the 200,000 mark by year-end 2010.

Android's Strategic Challenges. Strategically, the mobile market may be very important to Google. How can Google help sustain Android's growth in the market? What is the best way for Google to monetize mobile computing? What can Google do to make Android-based handsets a "must-have" over the iPhone, BlackBerry, and Nokia systems? With the exponential growth of wireless computing, how can Google appease wireless providers?

China

In December 2009, Google and about 20 other companies were the targets of a highly sophisticated attack dubbed "Operation Aurora."⁷⁶ As a major market, this event had serious implications for Google and changed the way it does business in China.

The Golden Shield Project and Operation Aurora. With more than 1.3 billion citizens, China is an ideal target for global expansion of products and services for many companies—Google included. However, inherent social fears and an autocratic form of government led by the Communist Party of China (CPC) prevent the easy access of foreign companies.

Billed as the Golden Shield Project (and also known as The Great Firewall of China), and affecting many of Google's offerings, in 2003, China announced that foreign media companies must seek prior approval before distributing pictures, graphics, and news.⁷⁷ This project was a censoring mechanism utilized by the Chinese government to monitor, track, and at times block access to subversive material. Prompted when the Chinese government recognized that access to YouTube provided viewers with sexually explicit and politically subversive material (such as video footage of the 1989 protests and government backed massacre in Tiananmen Square), it evolved into a much broader level of control that ultimately prevented Chinese citizens from accessing all of Google's applications.

Investigative research conducted by Google found that not only did the attacks originate in China with the primary goal to access Gmail accounts of Chinese human rights activists,⁷⁸ but that the attacks were so sophisticated—utilizing highly advanced levels of encryption to avoid detection—that most concluded the Chinese government was involved.⁷⁹ In the end, Google determined that Aurora accessed only two Gmail accounts; however, the ongoing investigation has revealed that dozens of advocates for human rights in China using Gmail in the US, China, and Europe have been hacked by phishing scams or malware intrusions.⁸⁰

In response to the network intrusions and the Chinese government's mandated censorship, Google decided it would not seek approval of its content from the Chinese government and instead now redirects all user attempts to access google.cn (Google China) to the uncensored google.com.hk (Google Hong Kong).

Baidu. In addition to its political/social struggle with the Chinese government, China is the home of one of Google's main regional competitors: Baidu. In 2008, Comscore data showed Baidu had passed Google to become the most popular country-specific search engine—and Baidu offers much more than just search.⁸¹ In addition to its e-commerce market and online payment business, the Baidu Union ad network claims more than 1 billion ad impressions daily.⁸² Baidu has been the main beneficiary of the explosive growth of the Internet in China. Currently, Baidu has nearly 70 percent of the market share in China: a number that has been growing 30 to 40 percent each year. Google China has approximately 20 percent market share and has experienced several execution setbacks in the past few years.⁸³ If Google chooses to pull out of China because of government controls, China will be left with just one major Internet search engine. Unfortunately, this would likely slow the development of the Internet in China. According to Yu Yang, a chief executive at Analysis International, a Beijing research firm, "The whole industry will become worse. Without competition with Google, Baidu has no motivation to innovate."⁸⁴ Baidu achieved the top spot in China due to its keen understanding of local tastes and its willingness to cooperate with government censorship. In three months time, Baidu stock climbed from ~\$52 to ~\$76⁸⁵ and some analysts speculate that Google's inability to catch Baidu may be one reason it is considering pulling out of China.⁸⁶

Strategic Challenges in China. Should Google stand by its "don't be evil" and "the need for information crosses all borders" philosophies and continue to provide uncensored content to China?⁸⁷ Alternatively,

does the additional market share make it worth the risk of exploiting the loopholes afforded by the Internet? Or will Google's OHA partners' concern about the potential of Google's position disrupting relationships with major Chinese cellular phone service providers force Google to play nice?

Privacy

As the Internet and its use grows, concern over online privacy has extended beyond that of the passing thought of a solitary programmer and into fodder for public speculation and conversation. The press has recently targeted the popular social networking site Facebook for exploiting access to user data and has criticized Google for eavesdropping on Internet traffic from wireless hotspots. Users are starting to take online privacy much more seriously, a fact that spells challenges for the company that knows more about most Internet users than any other.

Each time it is used, Google's search engine saves personal information surrounding the user's areas of interests using a system of tracking cookies. In addition, email content (Gmail), personal and business schedules (Google Calendar), favorite destinations searches (Google Latitude), viewing habits (YouTube), voicemail (Google Voice), online business and personal collaborations (Google Docs), Photos (Picasa), and even favorite books (Google Books) are also available to Google.⁸⁸ The fact that Google even possesses such data makes it a ripe target for attacks such as Project Aurora.

History has shown us that information leaks, data system attacks, and data spills happen. In 2006, AOL inadvertently released the search activity of 658,000 users quickly sending a shockwave of concern throughout its customer base and negatively affecting its membership and reputation.⁸⁹

Social networking site Facebook, the world's second most popular Web site (after Google),⁹⁰ has fueled the fire of privacy concerns by exhibiting repeated disregard for user privacy. Information like photos and status updates that were originally private have become publicly available, user data is being shared with third parties without explicit approval, changing the default privacy settings is complicated and cumbersome, and completely deleting a Facebook account is notoriously difficult.⁹¹ As a result, Facebook has become a lightning rod for privacy concerns, a trend that is now turning its eye toward Google.

While Google has had relatively few major privacy violations, there is a great deal of "what if?" speculation regarding what could happen when one company is responsible for so much private data. The most notable privacy issues caused by Google include Google Buzz and Wi-Fi eavesdropping.

Google Buzz. Google launched its new social networking service, Google Buzz, to compete directly with Facebook and, blending the worlds of private email and public social communication, Google fully integrated its new app with users' Gmail accounts. However, in a much-criticized and quickly reversed decision, unless users opted out, Google had made the default setting of Google Buzz to publicly display all of a user's Gmail contacts thus triggering an immediate outcry from privacy experts and resulting in Google's revision of the settings.⁹²

Wi-Fi Eavesdropping. Thinking it could kill two birds with one stone, when Google sent its Street View vehicles out to take 360-degree photographs of streets around the world, it also tasked them with indexing and cataloging the wireless networks within range of their routes. In doing so however, they were also saving whatever users were doing on those wireless networks at the time: approximately 600 GB of data per network. Google announced that it was not aware its Street View vehicles were capturing the data and Alan Eustace, Senior VP of Engineering and Research, wrote, "We are acutely aware that we failed badly here."⁹³

Strategic Challenges for Privacy. Moving forward, under increased scrutiny of privacy, how can Google

maintain the trust of the Internet-using public—without which it would be impossible to continue its current business practices?

Conclusion

All things considered, Google has come a long way from its simple beginnings as a grad school project to becoming a defining icon of the culture of the Internet age. While Google has competition in each industry it serves, its main cross-industry competition comes from the giants of the digital age: Apple, Microsoft, and Yahoo!

Despite the fact that Google is in an excellent position technologically, financially, and culturally, there are still real challenges looming on the horizon. These challenges take the form of growth for its mobile platform, a rapidly worsening situation in China, and an increased focus on user privacy that, unaddressed, could threaten Google's status.

Faced with a rapidly changing world and a constantly moving technological landscape, Google's strategy of providing excellent services to end users at no cost has won many computing hearts and minds. However, with a thoroughly undiversified revenue stream, it is wise to continue to innovate, keep its ear to the ground, and not rest solely on its current strong base.

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