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Online Portals

Por·tal *n* A doorway, gate, or entrance, especially a large and imposing one.

—*Webster's New World Dictionary*

Introduction

Through the late 1990s, the Internet continued to evolve at a frenetic pace. From a little-known channel for data exchange between academic researchers, by late 2000 it had been transformed into a global network connecting over 100 million host computers containing 2.7 billion Web pages.[1] With a profusion of websites, it was only natural that portals emerged to help guide Internet users through all the clutter. Portals quickly became the most heavily trafficked Internet destinations against all metrics: unique audience, reach, and visits per person (see **Exhibits 1** and **2**). By 2000, they had become central hubs for online content, communication, community, and commerce. At the same time, however, some industry observers questioned portals' future. As Internet users became more comfortable navigating the World Wide Web, would the value proposition of portals remain compelling?

This note describes the online portal business model. The first section defines the model, offers a summary of the various ways that online portals create value for their customers, and presents different ways to categorize portals. The second section analyzes the business model for portals, focusing on the tactics they can use to acquire new users, turn new users into repeat visitors, and monetize user traffic. The third section examines portal economics, describing their revenue and cost drivers. Building on that analysis, the fourth section examines the payoff to Internet portals from pursuing a "Get Big Fast" strategy, i.e., investing aggressively in customer acquisition and brand building. The final section explores the challenges facing companies that aspire to develop portals for new online access technologies, such as wireless data and interactive television.

[1] Matrix.net November 1, 2000 press release for number of host computers; Laura Carr, "100 Numbers You Need to Know," *Industry Standard,* November 20, 2000, p. 291 (citing NEC research) for number of web pages.

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What Are Portals, And How Do They Add Value For Users?

The only place anyone has to go to find something, connect with someone, or buy anything.

— Yahoo! mission statement[2]

As Internet use accelerated beginning in 1994, the number of websites also proliferated. This self-reinforcing phenomenon led to a need for help with navigation. To that end, two types of sites, directories and search engines, came into being. Directories were guides to the web compiled by human editors and organized by category (e.g. arts, business, news, health). Users followed a hierarchy of headings and subheadings (e.g., arts>awards>music>genres>country) to locate sought-after information. The end result was usually a link to a specific Web page with the information needed. Critical success factors for directories included comprehensiveness and clear, coherent organization of the hierarchies. Examples of directories included Yahoo!, LookSmart, Snap!, and NorthernLight. Search engines, on the other hand, compiled key words from Web pages into databases which users could query. These search engines continually "crawled" the Web capturing, storing, and indexing the latest site information. The critical success factor for search engines was the number of Web pages indexed. The larger the index, the more likely it was that the search engine maintained a comprehensive record of the Web. Yet, with large indexes new organizational challenges emerged, most notably, how do we give the user *just* what they want? Examples of search engines included Alta Vista, Excite, Infoseek, and Lycos.

Due to the need for navigational services, directories and search engines quickly grew to be among the most heavily trafficked sites on the web, and prospered with a business model that monetized this traffic by selling advertising. Since ad revenue increased in direct proportion to the number of "eyeballs" delivered, these sites gradually shifted their strategies away from quickly linking users to destination sites; they began encouraging users to linger. With that goal, directories and search engines sought to build user loyalty by adding content and "sticky" features such as e-mail and user chat rooms. In the process, the directories and search engines began to more closely resemble each other: directories like Yahoo! added search engine capabilities by licensing technology from vendors such as Inktomi, and search engine sites organized their new content into directory-like "channels." Eventually, strategies to boost the frequency and duration of user visits caused search to become a smaller percentage of total page views. At that point, industry observers began to refer to the original search and directory sites as "portals," a term coined by Halsey Minor, then CEO of CNET, in 1997.[3]

In the spirit of the Internet, the definition of a portal kept changing. At its simplest, as the name implied, a portal was a doorway to the Web, a launching pad that a user could employ as a homepage before heading to other destinations. As explained by David Marshak, a vice president at Patricia Seybold Group Inc., "Portals diminish the amount of flailing people have to do on-line."[4] At the same time, portals were evolving into sites that a user continually returned to throughout the day in order to manage a multitude of daily online activities, for example, checking news headlines and stock quotes, sending e-mail and instant messages, and joining chat groups.

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[2] Michael Parekh, "Yahoo! Inc." Goldman Sachs Equity Research, October 27, 2000, p. 6.

[3] Kara Swisher, " 'Portal' Industry Looks for New Name," *Wall Street Journal Europe*, 21 September 1998.

[4] Andrea Petersen, "What Is a Portal – and Why Are There So Many of Them?" *Wall Street Journal*, December 10, 1998.

Thus, portals performed many different functions, yet, their essence was comprised of five core elements: search, content, community building, commerce, and personal productivity applications:

- **Search services** included search engines, directories, Yellow Pages services for locating local businesses, "People Finder" services for tracking down phone numbers and/or e-mail addresses, MP3 finders for locating downloadable music files, and "shopping bots" for locating merchandise and comparing the prices offered by different online retailers.

- **Content** comprised topical information such as news headlines, stock quotes, sports scores, weather forecasts, and local event listings; reference information such as maps and dictionaries; entertainment options including games and links to Internet radio stations; and third-party produced content in special interest areas, e.g., information about automobiles, travel destinations, or personal health.

- **Community building features** included chat rooms, message boards, instant messaging services, online greeting cards, applications for exchanging digital photos, personal classifieds (e.g., "Single Male, 35, seeks …"), and free personal home pages.

- **Commerce offerings** included classified advertisements for jobs, cars, and homes; auctions; shopping malls aggregating small online retailers' websites; and links to external shopping sites nested within relevant content categories.

- **Personal productivity applications** included web-based e-mail, address books, calendars, file storage, and bill payment services.

Portal users spent about one-third of their time conducting searches; one-third sending messages and participating in chat groups; and one-third accessing other content.[5]

None of the features described above were unique to portals. For example, for search services, Yahoo partnered with Google, the acknowledged search engine leader in terms of Web pages indexed. Also, for the most part, portals did not create the content they presented, but rather obtained it through a variety of partnerships with online content providers. For instance, Yahoo! and Snap! offered the same mapping feature, which was licensed from Vicinity. Likewise, while portals offered access to online shopping, they themselves were not retailers: portals did not make merchandising decisions, nor did they take title to goods or arrange for their shipment. Thus, a user could turn to stand-alone sites for most of the services offered by portals. The unique value proposition for portals was the convenience they offered users by aggregating and organizing a vast array of content, commerce, and applications developed by others.

The discussion above, along with much of the analysis that follows, focuses on portals that help users navigate the World Wide Web. However, portals have emerged to fill similar convenience needs with respect to other new online technologies, including wireless data delivered to cell phones and Personal Data Assistants (PDAs); interactive television services; and voice recognition services (e.g., Tellme; BeVocal) that deliver pre-recorded or speech-synthesized information in response to requests spoken into a landline or mobile phone. Whenever new technologies have emerged, three sets of players have tended to vie to fill the portal role: startups; existing Internet portals (such as Yahoo! and AOL); and the infrastructure companies who deploy the enabling technologies and who have direct relationships with customers who use it. The strategy issues facing competitors who

[5] Jan Rivkin and Jay Girotto, HBS Case: 9-700-013, "Yahoo!: Business on Internet Time," January 6, 2000, p. 3.

aspire to create portals to serve users of new online technologies are discussed in the final section of this note.

Portal Taxonomy

As the industry evolved, two types of portals emerged, delineated by the breadth of content and commerce offerings they aggregated. *Horizontal portals* (also referred to as mass market or general purpose portals) directed users to a broad range of content and commerce destinations; they tried to be "all things to all people." Examples of horizontal portals included AOL, Alta Vista, Excite@Home, Go Network, Lycos, MSN, and Yahoo! *Vertical portals,* on the other hand, directed users to content and commerce offerings within a single thematic area such as personal finance, music, or sports. Examples of vertical portals included CNET, iVillage, Marketwatch, and Sportsline.com.

Horizontal Portals. Horizontal portals could be further divided into three categories: "The Big Three," "Also Rans," and "Portals with a Wrinkle". "The Big Three" were AOL, MSN, and Yahoo. "Also Rans" included Alta Vista, Excite@Home, Disney's Go Network, NBCi (which included Snap!) and Lycos. Lastly, "Portals with a Wrinkle"—labeled as such because they differentiated themselves by providing navigational assistance in a unique manner—included Ask Jeeves, Google, and GoTo.com, among others. These sites focused on their search and directory services; they typically did not provide all of the other core elements of a portal cited above, i.e., content, community building, commerce, and personal productivity applications. Their search and directory "wrinkles," which attempted to tackle some of the limitations that Internet users encountered when they relied on more traditional directories and search engines, were as follows:

- *Ask Jeeves* employed a user-friendly interface built around its British butler-like "Jeeves" character, with a natural language search engine that delivered search results more likely to be relevant to the user. For example, asking Jeeves, "Who really discovered America?" yields several sites that directly address the question. Entering *discovery of America* into Yahoo!'s search engine without putting parentheses around the phrase (a search convention that many Internet users do not understand) yielded 67 site matches as of November 2000, only a handful of which were relevant. The first three results listed included links to a television show about witchcraft trials on the *Discovery* Channel; a tour operator that specialized in journeys of self-*discovery;* and a company that specialized in forensic data *discovery* for corporate *America.*

- *Google* employed a page ranking system to improve search results. The value of a given page was determined by the number of links to that page from other websites. Links were interpreted as votes of confidence in the page, and links that came from pages that had themselves been linked to many times were weighted more heavily. By contrast, most other search engines simply used the incidence of keywords on a given page to determine the priority of listing. With this traditional approach, search engines tended to unearth many obscure and often irrelevant pages that happened to repeat a search term frequently.

- *GoTo.com* enabled marketers to bid in an ongoing auction for priority placement in the company's search results; marketers were listed in descending order of bid price. Each marketer paid GoTo.com the amount of its bid (which was plainly visible to consumers as part of the search results) whenever a consumer clicked-through on its listing. For example, in November 2000, iGo.com, which provided "solutions for people on the go," paid GoTo $0.04 for each click-through following searches on the term "laptop

adapters."[6] Some observers looked askance at a process that allowed marketers to openly "bribe" a search engine. GoTo argued that its process served consumers well, because marketers would only pay for placement when they had products or services that met consumers' needs.

The logic of this delineation was evident upon comparison of the portals' operating statistics (see **Exhibit 3**). As of June 30, 2000 it was clear that AOL, Yahoo, and MSN had broken away from the pack in terms of unique visitors and consequently overall reach (i.e., the percentage of Internet users that visited a site during a period of time). AOL , Yahoo!, and MSN were drawing 48 million, 45 million, and 43 million unique monthly visitors, respectively, which translated into a reach of approximately 57%, 54%, and 40%. These statistics were in sharp contrast to the performance of the other horizontal portals. For example, the "Also-Rans," only drew between 13 and 23 million unique visitors per month, representing a reach of 15% to 27%. "Portals with a Wrinkle" only garnered between 3 million and 8 million unique users per month, equating to a reach of 4% to 10%.

The three level split also bore itself out in "stickiness" (i.e., the amount of time the average user spent on a portal) and "page view" metrics. Against these measures, Yahoo! reigned supreme as the only portal with a time per person per month of over one hour and monthly page views per user in excess of 120; MSN was a close second, while other portals dropped off dramatically: GoTo.com's users, for example, spent only 4 minutes per month on the site. Yet, GoTo's management maintained that this result was consistent with its business model: by asking marketers to bid for placement in search results, users could quickly retrieve what they needed; they did not have to wade through page after page of irrelevant search results or through a multi-level directory hierarchy. GoTo argued that its competitors' inefficient search processes sacrificed users' needs in order to generate more page views and advertising impressions.[7]

Vertical Portals. Vertical portals revolved around users' interests; thus, they came in many varieties. Affinity portals were designed to appeal an audience's self-identity, based on factors such as gender, race, age, religion, and sexual preference. Examples included iVillage for women, BET.com for African-Americans, iTurf for teens, and PlanetOut for gays and lesbians. Avocational portals provided content and commerce opportunities around users' hobbies and entertainment interests. Examples were SportsLine.com, Epicurious (for cooks), and Launch (for rock music fans). Still other vertical portals served users' professional interests, e.g., SolidWaste.com.

These vertical portals, like their horizontal counterparts, tended to include most or all of the core elements of a portal cited above: search and navigational services; content; community building services; commerce offerings; and personal productivity applications. Notwithstanding this point, the distinction between vertical portals and other Internet business models could easily be blurred. For example, several of the examples cited in the previous paragraphs (e.g., CNET; Epicurious) produced a majority of their content in-house (although they also licensed a significant portion of their content from third parties). In that regard, they were more properly defined as online content providers than vertical portals. Likewise, online brokers such as Microsoft Carpoint provided links to a wealth of third party information to enable consumers to research purchase decisions, but their purpose in doing so was to help facilitate a transaction—not to help users navigate the Web. Since most vertical portals had another Internet business model at their core, in order to avoid confusion in explaining

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[6] According to Jamie Kiggen, "GoTo.com," DLJ Equity Research, August 13, 1999, 69 different advertisers were willing to pay GoTo for listings in the insurance category. The $3.50 per click-through payment by the highest bidder in that category amounted to a $3,500 CPM—a very high rate by Web standards.

[7] According to Jamie Kiggen, "GoTo.com," DLJ Equity Research, August 13, 1999, GoTo generated 850 referrals per thousand page views, compared to on 81 referrals per thousand page views for Yahoo! With its transaction-based model, GoTo did not require "stickiness" to earn a comparable profit per user.

the central characteristics of the portal business model, the balance of this note will focus exclusively on horizontal portals.[8]

Horizontal Versus Vertical Portals. By 1999, vertical portals were gaining share at the expense of horizontal portals. While the total time spent on the Web per user grew by 6.3% in 1999, the total time per user spent visiting horizontal portals actually declined by 4.7%. In contrast, the time spent per user visiting a group of vertical portals nearly doubled over the same time period.[9] Industry observers were not surprised by these trends; they expected that as Internet users became more familiar with the Web, they would bookmark specialized sites that met their needs, and would bypass general-interest portals.[10] By 2000, there was even more evidence that consumers were behaving in this manner. Between February 1999 and August 2000, the average number of unique sites visited in a month had declined from 15 to 10.[11] Consistent with this finding, Jupiter Communications reported survey results that indicated that consumers, when seeking online destinations, were less likely to use a search engine (35% of consumers said they were likely to do so in 2000, down from 41% in 1999) or visit a portal's shopping channel (2% in 2000, down from 6% in 1999).[12]

This shift in user preferences had implications for portals' revenue growth prospects. Through the late 1990s, by virtue of their status as largest aggregators of online users, horizontal portals had received a share of ad revenue that was disproportionately large, compared to their share of total page views generated by ad-supported websites. Advertisers have historically been willing to pay a premium for media properties that generate superior reach, because they often value the ability to simultaneously exposure a large number of unduplicated prospects to their messages. *People* and *TV Guide*, for example, which were two of the largest consumer print magazines, commanded advertising rates per impression that averaged 22% more than rates charged by other magazines ranked among the top 130; top-rated network television shows commanded a similar premium.[13] But the premium accorded to horizontal portals was much greater: according to Forrester Research, in 1999, the seven largest horizontal portals generated 20% of the page views for ad-supported sites, but captured 65% of total Internet advertising revenue.[14] Based on the magnitude of this premium, it seemed possible that advertising on a well-established mass market portal like Yahoo! was seen by many marketing executives as a "safe" way to venture online—in the same way that buying a mainframe from IBM was once seen as a low risk way to introduce information technology to a corporation.

In 1999, vertical portals (defined by Forrester as the other 93 sites among the 100 most heavily trafficked ad-supported websites) accounted for 20% of page views—the same amount as the seven largest horizontal portals—but vertical portals earned only 24% of total online ad revenue.[15] Forrester predicted that the reach premium commanded by horizontal portals would decline over time: by

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[8] For more information on the online content provider business model, see Thomas Eisenmann and Alastair Brown, "Online Content Providers," HBS Case: 9-801-261.

[9] Arthur Newman, "Internet Portals: Evolution or Extinction," Schroeder & Co., September 7, 1999.

[10] Aram Sinnreich, "Portal Evolution – Building Share Market by Market," Jupiter Communications, April 26, 2000.

[11] Jeffrey Fieler, "Yahoo! Inc.," Bear Stearns Equity Research, September 29, 2000, p. 46, citing Nielsen/NetRatings data.

[12] Michele Slack, "Portal Tenancy Deals," Jupiter Communications, July 25, 2000, p. 10.

[13] Chris Charron, "The Great Portal Shakeout," Forrester Research, March 1998.

[14] Charlene Li, "The Parting Of The Portal Seas." Forrester Research, December 1999.

[15] According to Forrester, "The Rest of the Web," i.e., ad-supported websites ranked below the top 100, generated the remaining 60% of page views accruing to ad-supported sites but received only 11% of total online ad revenues.

2004, Forrester projected that horizontal portals would receive 40% of total online advertising (down from 45% in 1999), compared to 32% for vertical portals (up from 24% in 1999) (see **Exhibit 4**). This migration of ad dollars to vertical portals was seen to be largely at the expense of four "Also Ran" portals (Lycos, Excite, Alta Vista, and Go Network), which Forrester projected would capture only 3% of ad dollars by 2004 (down from 20% in 1999). In other words, the aforementioned portal delineation was expected to continue: "The Big Three" were seen as co-existing with a multitude of smaller vertical portals, while the horizontal mid-tier portals would be forced to adjust their business models. By late 2000, this adjustment was underway: AltaVista had laid off 25% of its workforce after announcing plans to refocus around its core search capabilities;[16] Disney's Go Network had relaunched as an entertainment and leisure portal; and Excite was repositioning itself as a broadband content portal, leveraging the fact that it was owned by the cable modem service provider @Home.[17]

Portal Business Model

Portals followed a three-step business model of: 1) acquiring new users; 2) turning new users into repeat visitors; and 3) monetizing user traffic. This section describes the strategies and tactics available to portals as they sought competitive advantage at each step.

Acquiring New Users

As noted above, search and directory services, the initial raison d'être for portals, still accounted for about one-third of horizontal portal traffic in 1999. Portals acquired a large share of their new users by providing such navigational services, which were particularly important for newcomers to the Web. Of course, to encourage new users to try their search and directory services, portals had to build awareness of their brands through online and offline advertising and word-of-mouth referrals. In addition, portals had four other avenues for acquiring new users: "utility" services ; internet access enablers; vertical integration with destination sites; and offline promotion through affiliated media properties.

"Utility" Services. Portals could acquire new users by providing "utility" services for communication or for improving personal productivity. These took many forms, including free email, online greeting cards; instant messaging; free web-based file storage, calendaring, and address books; and bill payment applications. Portals often acquired these services as free-standing companies and then integrated them into their home pages; in the process, the acquired service's existing users might be converted into new users of the broader portal. For example, in January 1998, Microsoft paid around $400 million for the free web-based e-mail service Hotmail and acquired 9.5 million Hotmail users.[18] Lycos acquired the personal homepage and community building site Tripod for $81 million in 1998, along with its one million registered users.[19] Other examples include the acquisitions of the greeting card site BlueMountainArts by Excite and web-based instant messenger ICQ by AOL. By mid-1999, ICQ had 34 million registered users, only 7% of whom overlapped with AOL's subscriber base.[20]

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[16] Tom Geck, "Alta Vista is Still Searching," *Red Herring,* November 13, 2000, p. 51.

[17] Richard Greenfield, "Walt Disney Internet Group," Goldman Sachs Equity Research, August 10, 2000.

[18] David Wilson, "Microsoft buys E-mail provider," *The Toronto Star* (January 2, 1998): B9.

[19] Jeffrey Fieler, "Lycos, Inc.," Bear Stearns Equity Research, October 17, 2000, p. 17.

[20] Jamie Kiggen, "Internet Observer: Where Seek is Find," DLJ Equity Research, May 18, 1999.

Internet Access Enablers. In order to use the Internet or other online services, consumers dealt with a series of hardware, software, and service providers. For example, to access the World Wide Web on a PC, a user interacted with a modem-equipped personal computer, the computer's operating system and Web browser, and with an Internet Service Provider (ISP) or an Online Service Provider (OSP).[21] Each of these points of contact provided an opportunity for portals to acquire new customers—especially when dealing with first-time Internet users.

Distribution Deals with PC Manufacturers. To supplement their low margin hardware sales with service revenues, some PC makers offered Internet connectivity with their equipment. Portals were able to partner with PC makers to provide a co-branded "start" page for such Internet access services. One example of this strategy was a deal between Dell Computer and Excite to create a custom version of the portal for Dell's ISP customers.

Vertically Integrated Browsers. The Web browser market in 2000 was dominated by Microsoft and Netscape (a unit of AOL), with 65% and 35% of users employing Microsoft's Internet Explorer and Netscape's Navigator, respectively.[22] Both firms could program their browsers to default to their own portal sites—MSN.com for Microsoft and Netscape.com for Netscape—unless specifically directed by the user (or an ISP) to another home page. According to a Netscape executive, 50% of its browser users defaulted to the Netscape home page.[23] As one observer remarked, "Great power lies in such default settings—power built on the seemingly inexhaustible well of human laziness."[24]

ISP Partnerships. Portals often partnered with ISPs to provide their subscribers with a start page. This was done by pre-programming the portal's home page to launch whenever a subscriber installed the ISP's software. The portal and ISP then split the ad and e-commerce revenues generated through the home page, with larger ISPs typically retaining 60% to 70% of revenues as of 1998.[25] One example of this strategy was Yahoo's partnership with MCI to develop a co-branded access service. Yahoo! Online, offered at $14.95 per month, included Yahoo's various content channels and its search and directory services. As part of the deal, Yahoo! received a bounty for new customers it steered to MCI's ISP and to other MCI services (e.g., long distance and cellular phone services).

Vertically-Integrated ISPs/OSPs. Portals could move a step beyond ISP partnerships and seek to acquire new users by entering the access business themselves, in one of three ways. First, companies could own both an ISP and a portal, managing them in an integrated manner. The acquisition of the portal Excite by the broadband service provider @Home was an example of such joint ownership. Microsoft provided another example of this approach: it operated an ISP called MSN with 3.5 million subscribers as of November 2000.[26] The start page for MSN subscribers defaulted to a portal with the same name. However, the MSN portal was freely accessible to Web users who relied

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[21] ISPs generally focus on the provision of Internet connectivity services; they maintain local network infrastructure—banks of modems, routers, and telecommunications lines—that facilitate the transfer of information between a subscriber's modem-equipped PC (or some other access device, such as a Web-enabled wireless phone or a TV set-top converter box) and other users of the public Internet. OSPs like America Online maintain a telecommunications infrastructure separate from (but usually interconnected with) the public Internet. OSPs use that infrastructure to provide access to proprietary, off-Web content and communities (for chat and instant messaging sessions) that only their subscribers can reach.

[22] Browser Study–1999, conducted by Zona Research, 300 IT experts were asked "which browser do you use most at work?"; for more into see: http://www.zonaresearch.com/browserstudy/1999/nov99/index.htm

[23] Michael Parekh, "Internet Portals," February 5, 1999, Goldman Sachs Equity Research, citing Mike Homer, Netscape EVP.

[24] Scott Rosenberg, "Any Portal in a Storm," *Salon* (June 22, 1998).

[25] Abhi Chaki, "ISP Revenue Strategies," Jupiter Communications, April 1998.

[26] Alec Klein, "AOL seeks cable pact with MSN," *Washington Post* (November 18, 2000): E01.

on other ISPs, and MSN ISP customers who wished to re-program their browser to open to another portal could do so.

A second approach involved portals outsourcing their branded ISP operations to another company. AltaVista, which relied on 1stUp to manage its free ISP service, was an example. Similarly Yahoo! relied on Spinway to manage the infrastructure and customer service operations for the Bluelight.com free ISP service that Yahoo! offered through a joint venture with the retail giant Kmart.

"Online Service Providers" (OSPs), like AOL, were a third type of vertical integration. OSPs maintained a telecommunications infrastructure separate from (but typically interconnected with) the public Internet. OSPs used that infrastructure to provide access to "walled gardens" that contained proprietary, off-Web content and communities for chat and instant messaging sessions.[27] Only the OSP's subscribers had access to the walled garden, which was organized as a portal. In addition to such proprietary content, OSPs such as AOL also provided its subscribers with access to the World Wide Web, but AOL users spent only a modest portion of their online time accessing websites: they spent an average of 40% of their total online time accessing the company's proprietary content and commerce offerings; 23% on e-mail; 20% on chat; and just 17% accessing Internet sites.[28]

Vertical Integration with Destination Sites. In addition to backward integration into access, portals could integrate forward and become the owners of content and commerce destination websites. Portals that owned popular destination websites were able to use those sites to drive new users back to the portal. Disney's Go Network was an example of this strategy. The Go.com portal benefited from traffic received from Disney.com, ESPN.com, ABCNews.com, and other Disney-owned Web properties. Similarly, MSN acquired traffic through Microsoft's stable of destination websites, including the car-buying service Carpoint, the online travel agency Expedia, and the news service MSNBC.com. Expedia, for example, received 54% of its visitors from MSN in late 1998.[29] Perhaps the most telling example of the benefits of integrating portal and destination websites, however, was the $166 billion acquisition by AOL of Time Warner, the world's largest media and entertainment company, announced in January of 2000.

Offline Promotion through Affiliated Media Properties. Lastly, companies that owned both Internet portals and offline media companies could run promotional ads on those offline media properties to drive new users to their portals. Examples of horizontal portals that benefited in this manner included Disney's Go.com, NBC's NBCi, and AOL through its link to Time Warner's businesses. Other media companies used similar promotional strategies to drive traffic to vertical portals that they owned, including Black Entertainment TV, which owned BET.com, and Discovery Communications, which owned Discovery.com, a vertical portal devoted to science and nature news and information.

Retaining Traffic

Step two of the portal business model entailed retaining the new users acquired in step one. The more frequently a user visited a portal and the more time he or she spent during each visit, the

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[27] A "walled garden" is an online service that makes it easy to access content and commerce offerings from its own exclusive set of business partners, but slower and harder (or sometimes impossible) to access third party offerings. AOL and Excite@Home are common examples of "walled gardens," and many cell phone operators are developing their new wireless data services in this manner. Technically, walled gardens were maintained through selective caching, attenuated connections to the Internet at-large and a new generation of data switches that can selectively delay data en route to and from non-preferred services. Steve McMahon, Davis Community Network, "Broadband Glossary and Bestiary," June 23, 2000.

[28] Patrick Keane, "Portal Deals," Jupiter Communications, July 1999.

[29] Saul Hansell, "Where Does Microsoft Want You To Go Today?" *New York Times,* November 16, 1998.

greater the opportunity for the portal to profit by collecting personal information, displaying ads, and selling goods. Portals attempted to retain users in several ways (some of which overlapped with acquisition tactics mentioned above). First, they sought to offer comprehensive and high quality directory/search services and content. Sometimes this meant securing proprietary access to content, to promote differentiation vis-à-vis other portals. Second, portals developed community-building features, including chat and instant messenger services. A portal could boost its traffic substantially when users with common interests interacted regularly in its chat rooms. AOL and Yahoo! went to great lengths to promote community building; for example, Yahoo! spent roughly $4 billion in February 1999[30] to acquire GeoCities, a service which provided users with the ability to create their own Web pages and which aggregated these pages into communities of common interest. Third, portals offered a wide range of personal productivity applications that, along with attracting new users, encouraged users to return regularly, e.g., free web-based email, bill payment services, online calendars and address books, and free web-based file storage. Finally, most major portals provided users the ability to customize their home page to deliver news and information tailored to users' personal interests, e.g., home town sports scores and weather; stock portfolio tracking; horoscopes. Users who customized home pages in this manner tended to be more loyal. For example, MyYahoo users spent about 30% of their total online time at Yahoo!, compared to an average of 10% for other Yahoo! visitors (see **Exhibit 5**).

Many of the features that portals offered to boost retention required user registration, i.e., users were asked to provide, at a minimum, an e-mail address, and often additional personal information. For example, Yahoo!, which had 166 million unique monthly visitors in September 2000, had registered 185 million by 3Q 2000. 55 million of Yahoo!'s registered users had been site visitors within the prior 30 days and these "active" registered users accounted for 55% of Yahoo!'s total page views.[31] Registration data was very valuable for portals in their marketing efforts: having a user's e-mail address allowed the portal to "push" special offers to that user. Furthermore, acquiring additional personal information through registration could be helpful in serving targeted advertisements, which portals sold at higher rates.

Portals' efforts to promote user retention led to feature proliferation: when one portal introduced a feature, others typically followed suit very quickly. The net result was that portals had become increasingly homogenous in terms of content, search technology, and even site structure and layout. Furthermore, despite the expensive proliferation of features intended to increase "stickiness," many portal users remained "promiscuous"—they were likely to frequent several different portals in any given month. For example, in June 2000, 46% and 45% of Yahoo's users were also visitors to AOL.com (i.e., AOL's site on the public Internet, not its "walled garden") and MSN.com, respectively; a similar share of the latter two websites' users frequented the other leading mass market portals (see **Exhibit 6**). Consistent with this data, Microsoft research showed that only one-third of portal users demonstrated "portal behavior," defined as using at least three services within the same portal site.[32]

Monetizing User Traffic

Step three of the portal business model involved monetizing the traffic that the portal generated. Foremost, advertising comprised approximately over 90% of portal revenue in 2000.[33] Most of the balance was earned from fees related to commerce offerings, e.g., auctions and hosting small retailers' websites in portal shopping channels. In the future, fees from commerce offerings

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[30] Simon Tuck, "GeoCities turns freebies into billions…," *The Globe* (February 25, 1999): T2.

[31] Michael Parekh, "Yahoo! Inc." Goldman Sachs Equity Research, October 27, 2000, p. 6.

[32] Saul Hansell, "Where Does Microsoft Want You to Go Today?" *New York Times,* November 16, 1998.

[33] Arthur Newman, "Internet Portals," ABN AMRO Equity Research, June 2000, p. 48.

were expected to account for a growing share of portal revenues, as were direct payments from users for premium services. For example, in late 2000, Microsoft charged $10 per month for access to its popular multi-player game, Asheron's Call, and AOL had announced plans to charge a $5 subscription payment for access to information and communications services delivered by phone through voice recognition services.

Advertising on portals took a variety of forms, including banner ads linked to certain directory entries or search keywords (e.g., Hewlett Packard might buy banners adjacent to search listings for a query on "laptops") and sponsorships of contextually relevant content (e.g., AutoWeb might sponsor Yahoo!'s content on new cars). Ad revenue was primarily generated on the basis of "impressions," although marketers were increasingly demanding deals whereby they would only "pay for performance," i.e., for click-throughs on their banners or for new customers acquired. One impression equaled one set of eyeballs passing over an ad one time. In 1999, online marketers paid for typical banner ads at an average CPM rate of $34.22, where "CPM" ("M" for the Roman numeral 1,000) meant the cost per thousand impressions delivered.[34] CPMs could vary widely depending on how likely the users exposed to a given impression were to respond to that ad, which in turn was related to where the ad appeared on a portal (see **Exhibit 8**). For example, a cruise line sponsoring a portal's travel channel might pay a CPM ranging from $30 to $100. By contrast, "run of site" banner ads had CPMs of $5 to $25. Such ads could appear anywhere on the portal (at the portal's discretion), for example, adjacent to chat sessions or online games, where ads were unlikely to be contextually relevant to users and were unlikely to garner much in the way of user response.

One could calculate the monthly ad revenue generated by a portal by multiplying: 1) the site's number of unique monthly visitors; 2) the average number of visits per user per month; 3) average page views per visit; 4) the average CPM divided by 1,000; 5) the sellout ratio, i.e., the percentage of pages viewed for which the site has received any payment from advertisers; and 6) the average number of impressions on pages that generate any ad payments. By definition, the last figure would equal or exceed one, because websites sometimes sold more than one banner ad per page. Sellout ratios would, by definition, be equal to or less than 100%, because most websites failed to sell their entire advertising inventory, and because some pages intentionally carried no ads (e.g., the page explaining a site's privacy policies). According to projections by ABN AMRO, the typical portal could be expected to sell 25% to 30% of its inventory at a CPM of $20 to $30, with each page carrying 2.0 to 2.5 ads.[35]

"Tenancy deals" with online marketers contributed a significant share of advertising revenues for horizontal portals; such deals were distinguished from ordinary ad campaigns by their scale and by their duration—they often involved multi-year commitments. The ubiquity of tenancy deals was evident in survey findings that indicated that approximately two-thirds of online retailers had a portal deal in place in 1999; of those that did not, one-half planned to develop some type of portal relationship in the future.[36] Furthermore, Jupiter Communications estimated that 18% of online shopping transactions in 1999 resulted from portal deals.[37]

In late 1999, a typical tenancy deal ran for 20 months and had a total value of $4.5 million; some, however, were substantially more expensive (see **Exhibit 8**). Deals were quite diverse in terms of other contractual provisions, e.g., the degree of exclusivity required by each party and whether the portal would be paid for raw impressions delivered, click-throughs to the partner's site, or new

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[34] For current and historical CPM rates see Adknowledge.com.

[35] Arthur Newman, "Internet Portals," ABN AMRO Equity Research, June 2000, p. 37.

[36] Fiona S. Swerdlow, " Portal Deals: Forecasts and Metrics for Acquiring Customers Through AOL, Yahoo! And other Portals," Jupiter Communications, 1999.

[37] Patrick Keane, "Portal Deals," Jupiter Communications, July 1999, p. 1.

customers actually acquired by the partner. Most deals provided guarantees from the portal in terms of how many impressions it would deliver to its partner and where banners and sponsorships would be exhibited.

In addition to such deals with online retailers, portals secured revenues—and a significant portion of their content—through tenancy deals with online content providers. Again, these deals were highly diverse in their structures: some content providers paid the portal to place content within a channel, but then kept all of the ad revenue generated through portal page views; others provided their content to the portal free of charge, then split ad revenues. Content providers viewed their portal distribution deals as important vehicles for customer acquisition; thus, they were eager to ensure that their brand was prominently displayed and that links were provided back to their site for consumers seeking deeper information.[38]

In light of the high cost of tenancy arrangements, it was not surprising that by 2000, these deals had suffered a predictable backlash from marketers and content providers: in a December 1999 Forrester Research survey, only 57% of retailers said portals deals were worth the price they paid and only 69% of them planned to renew their deals.[39] The director of marketing for Petstore.com, for example, complained that his company's acquisition cost per new customer had been $200 through a Yahoo! portal deal, compared to a $20 target.[40] Other marketers reported that the price of portal deals had declined by as much as 75% in response to concerns about efficiency and a winnowing out of online marketers (of the four leading pet supply sites, for example, Petstore.com and Pets.com had failed by late 2000, and Petopia had laid off a significant share of its workforce).[41] It was difficult to determine how much of this reflected self-serving posturing versus a true shift in bargaining dynamics between portals and advertisers. Yahoo!'s renewal rates for its advertising deals, for example, had slipped in late 2000 but still remained quite high: 85% of its 200 largest clients had renewed their deals in 3Q 2000, down from renewal rates in the high 90% range in previous quarters.[42]

Portal Economics

The economic model for online portals is, at its core, fairly simple. Portals incur mostly fixed costs to aggregate content, community building features, and personal productivity applications; the

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[38] For more information on content syndication deals, see Thomas Eisenmann and Alastair Brown, "Online Content Providers," HBS Case: 9-801-261.

[39] Charlene Li, "The Parting of the Portal Seas," Forrester Research, December 1999.

[40] Suein Hwang, "Yahoo's Grand Vision for Web Advertising Takes Some Hard Hits," Wall Street Journal, September 1, 2000, p. A6. In 1999, online retailers spent, on average, $82 cost to acquire a new customer, according to Boston Consulting Group/shop.org, "The State of Online Retailing 3.0," April, 1999; Charlene Li, "The Parting of the Portal Seas," Forrester Research, December 1999, quotes an online retailer affiliated with a bricks-and-mortar chain as saying that its customer acquisition costs through portals had averaged $55, compared to $12 through nonportal websites.

[41] Suein Hwang, "Yahoo's Grand Vision for Web Advertising Takes Some Hard Hits," Wall Street Journal, September 1, 2000, p. A6 cites interactive ad agency executive Anna Collins as saying that whereas Yahoo! once charged her clients $20 million for a three year deal, clients now could sign one year deals for $1-2 million. Bob Tedeschi, "Advertising Grows Easier on Portals," New York Times, November 13, 2000, reports a 75% decline in costs over the prior 18 months, quoting Al Noyes, head of marketing for online retailer SmarterKids.com. Finally, David Smith, head of media buying firm Mediasmith, reported the CPM for portal ad buys had declined from $18-20 in 1999 to less than $5 by the end of 2000 (Leslie Kaufman, "Testing the Retailing Net," New York Times, November 21, 2000).

[42] Michael Parekh, "Yahoo! Inc." Goldman Sachs Equity Research, October 27, 2000, p. 4.

variable costs associated with service delivery are minimal. Portals then invest in marketing activities to drive users to their site and generate page views. Finally, they hire a direct sales force to sell these page views to advertisers. Ad spending varies directly with the number of users; the number of users varies directly with marketing spending—provided the company has spent enough to develop an appealing product. If the portal does not need to continue to spend heavily on marketing to *retain* customers—a crucial assumption—then profits should grow rapidly once the portal's customer base generates enough ad revenue to cover the fixed costs mentioned above.

The balance of this section explains the economic model of portals in greater detail. First, it looks at portals' operating costs and their costs related to customer acquisition. Then, it examines the question of profitability, and compares the cost of acquiring customers to the discounted present value of the contribution margin those customers bring to the portal. After all, if you pay more to attract customers than they are worth, economic success will be elusive!

Operating Costs. Operating costs for a horizontal portal fell into four categories: 1) cost of revenues; 2) ad sales costs; 3) product development costs; and 4) general and administrative (G&A) expenses. The first three categories are examined below; G&A expense includes typical overhead items such as salaries for legal, human resources, and finance staff and payments for professional services, and is not discussed further.

Cost of Revenues. Cost of revenues included license fees paid to third party content providers and search engine technology providers and payments to firms providing hosting and telecommunications services. Although larger portals benefited from greater purchasing clout, such costs tended to vary fairly directly with revenues. For Yahoo!, cost of revenues was projected to be 14% of 2000 revenues. For Lycos, which was about one-third of Yahoo!'s size, cost of revenues was projected to be 17% of 2000 revenues.[43]

Ad Sales Costs. Portals maintained large direct sales forces comprised of reps selling on commission. Portals did not disclose how much they spent on their ad sales operations; such costs were combined with marketing expenses in portals' financial statements. Yahoo!, for example, spent $215 million (37% of revenue) in 1999 on "Sales & Marketing;" of this amount, $80 million was spent on advertising for customer acquisition and brand building, and a portion was spent securing distribution (e.g., deals to provide links to Yahoo! services on the desktops of new PCs sold by computer manufacturers such as Hewlett Packard). Hence, we can infer that Yahoo! spent something on the order of 10% of its revenue on ad sales operations in its 14 U.S. sales offices and 16 international locations.[44]

Since ad sales reps are paid on commission, expenses associated with ad sales operations do vary to some extent with site traffic and sales volume. However, if revenues triple over a three year period, it is not likely that ad sales expense will also triple: sales reps typically are assigned a certain number of accounts, and their sales targets for earning commissions from any given account will tend to be adjusted upward each year. However, if revenue growth stems from signing *new* accounts, then the company is likely to need to add sales reps and thus its ad sales cost will increase in absolute terms. Yahoo!, for example, had benefited both from growth in the number of advertisers it served and from increased spending per advertiser. In Q2 2000, 3,600 companies placed ads on Yahoo!, a

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[43] All Yahoo data in the "Portal Economics" section not specifically referenced in an exhibit are from Jeffrey Fieler and Manuel Hernandez "Yahoo!, Inc.," Bear Stearns, September 29, 2000. Likewise all Lycos data are from Jeffrey Fieler and Manuel Hernandez "Lycos, Inc.," Bear Stearns, October 17, 2000.

[44] Lycos, in its SEC filings, disclosed that 419 of its 902 U.S. employees as of mid-2000 were engaged in sales and marketing operations. 359 were employed in product development functions. The remaining 124 were involved in finance and administrative activities.

four-fold increase since mid-1997. These advertisers each spent an average of $67,000, again, a four-fold increase since 1997.

Product Development Costs. Portals spent heavily on system development staff and the professional services they contracted to enhance and maintain their sites. Product development expenses—which included the cost of staff engaged in organizing directory listings—were projected to be $97 million in 2000 (9% of revenue) for Yahoo! and $55 million (16% of revenue) for Lycos. Even though such costs were almost completely fixed, they had not declined much as a percentage of revenue (Yahoo! spent 13% of 1998 revenue on product development) because portals continued to invest heavily in site improvements, in new technologies such as broadband and wireless delivery, and in international expansion.

Customer Acquisition Costs. As noted in the previous section, most customers were acquired as a result of online and offline brand building efforts. In 1999, Yahoo! spent $80 million (14% of revenue) on such advertising; for its fiscal year ended July 31, 2000, Lycos spent $23 million (8% of revenue). Dividing advertising costs by the increase in unique visitors during that period provides an indication of a portal's acquisition cost per new customer. Against this metric, Yahoo! clearly benefited from its strong brand recognition and from the scale economies available in mass media advertising: Yahoo! spent about $3 in advertising per new user in mid-2000, whereas Lycos spent about $7.[45]

Profitability. Once a portal expanded revenues beyond the point where it covered its fixed costs, profit growth could be very strong. This was clearly evident upon review of Yahoo!'s financial performance, compared to Lycos's (see **Exhibit 9**). Yahoo!'s revenues had grown from $21 million to $589 million between 1996 and 1999, and were projected to nearly double in 2000 to over $1 billion. In 2000, Yahoo! was projected to earn $412 million in operating profit—a 38% margin on revenues. Lycos, with less scale, had only recently reached the breakeven point: the company was projected to earn a 10% operating margin in calendar year 2000, compared to –7% the prior year.

Analysts saw the potential for further margin expansion. Bear Stearn's equity analyst, for example, predicted that Yahoo! could eventually earn a 62% operating margin as it reduced advertising expenses to the 7% range more typical for leading brand marketers like Coca-Cola and McDonalds, and as it continued to leverage fixed costs in product development and administrative functions (see **Exhibit 10**).

Lifetime Value of a Customer. A company creates value when it spends less to acquire a new customer than the discounted present value of the variable contribution margin that customer will generate. To calculate the lifetime value of a portal customer, we need to estimate the average duration of a customer relationship. ABM AMRO speculates that such relationships might last 10 years on average.[46] Although little data is available to estimate this critical parameter, 10 years seems excessive, since: 1) competition between portals is strong; 2) the Internet continues to evolve rapidly, and new companies may emerge to better meet customer needs, especially related to new technologies; and 3) few offline media businesses manage to achieve average customer relationship life spans in excess of three to four years. Assuming: 1) a relationship of five years duration; 2) $6 in annual revenue per visitor (Yahoo! generated about $8 in 2000; Lycos realized about half that amount); 3) an 85% variable contribution margin; and 4) a 10% discount rate, then the present value of the variable contribution margin from a customer is about $19. This compares favorably with the customer acquisition costs cite above in the range of $3 and $7 for Yahoo! and Lycos, respectively.

[45] Jeffrey Fieler, "Yahoo! Inc.," Bear Stearns Equity Research, September 29, 2000, p. 62.

[46] Arthur Newman, "Internet Portals," ABN AMRO Equity Research, June 2000, p. 37.

Given these economics, we might expect Yahoo! and Lycos to continue to invest aggressively in marketing, i.e., to pursue a "Get Big Fast" strategy.

"Get Big Fast": A Strategic Imperative for Online Content Providers?

Many Internet companies have pursued "Get Big Fast" (GBF) strategies, involving massive upfront investment in customer acquisition and brand building. The premise of such strategies is that the early days of the Internet are a "land grab:" according to this view, companies will find it easier to stake out wide swaths of empty territory now, rather than try to capture that territory later, after it has been settled by others. The payoff from the GBF strategy tends to be strongest when the following conditions apply: network effects are strong; scale economies (beyond network effects) are significant; and customer retention rates are intrinsically high. This section explores the extent to which these conditions apply for portals.

Network Effects. Network effects occur when the adoption of a product or service by a new customer increases the value of that product or service for customers already using it, because existing customers now can "connect" with more parties.[47] The concept of connectivity applies for any network which facilitates point-to-point transactions, e.g., a postal system, a telephone network, or a railroad. To use the classic example, the value of each existing fax machine increases very slightly for its owner upon the sale of every new fax machine, because each party in the network can reach additional users. Or, to use an online example, nothing is lonelier than an empty chat room! In fact, according what has become know as Metcalfe's Law (after Bob Metcalfe, inventor of Ethernet), the value of a network is equal to the number of its users squared; hence, there is an exponential benefit from a linear increase in the size of a network.

Two of portals' core services—search/directory services and the aggregation of content—were not subject to network effects. However, portals were able to exploit strong network effects in several other areas: including chat, instant messaging, auctions, multi-player games, web-based photo albums, classified ads, personals, communities of interest comprised of users' personal Web pages, and hosting websites for small online retailers (hosting more retailers attracts more shoppers, which attracts more retailers, etc.). Given this broad range of applications that are subject to network effects, portals can realize fairly strong first-mover advantages: early movers like AOL and Yahoo! found it relatively easy to maintain momentum, whereas late-comers like Disney's Go Network and NBCi found it difficult to engage prospects, who gravitated instead toward established portals that already serve their friends, family members, and co-workers.

Scale Economies. As should be evident from the analysis of costs in the previous section, portals are subject to extremely strong economies of scale. Variable costs are only about 15% of revenues, so a significant portion of any revenue growth translates directly into either: 1) increased profits; or 2) the ability to re-invest in website improvements. Thus, a first mover that gains momentum can sustain that momentum by exploiting its superior margin structure to outspend its rivals.

Retention Rates. If a site has a high retention rate, then GBF investments in customer acquisition are likely to have a higher payoff. If retention rates are low, then a website becomes a

[47] See Carl Shapiro and Hal R. Varian, *Information Rules* (Boston, MA: Harvard Business School Press, 1999), pp. 173-225 and Philip Evans and Thomas S. Wurster, *Blown to Bits* (Boston, MA: Harvard Business School Press, 1999) pp. 112-113.

"leaky bucket:" new customers are acquired, but they leak away, and need to be replaced, incurring additional acquisition costs.

Retention rates tend to be high in the presence of network effects. As noted above, portals benefit from network effects in a number of key applications—most notably chat and instant messaging, so we would expect their rates of user retention to be reasonably high. Even in the absence of strong network effects, websites may still have intrinsically high retention rates if there is a solid basis for competitive differentiation in the business (beyond network effects) or if it benefits from some type of switching cost. For example, in the case of online brokerage firms, the hassle associated with terminating a funded account creates a strong switching cost.

Online portals have relatively few meaningful opportunities for competitive differentiation, compared to some other Internet business models, such as online content providers (where distinct journalistic styles may appeal to diverse user tastes). Because portals aggregate content and applications that have for the most part been created by third parties, any point of differentiation introduced by a portal is usually copied quickly by its competitors. Exceptions to this rule tend to involve "Portals with a Wrinkle"—companies like AskJeeves or GoTo.com that build an entire site around a novel search methodology.

With respect to switching costs, portals benefit from personal productivity features that require users to invest in data entry, e.g., customized home pages; web-based calendars, address books, and bill payment services. Although only about 20% of users customized a portal home page,[48] users that did so, as mentioned earlier, demonstrated substantial greater "stickiness" (see **Exhibit 5**). Also, to the extent that portal users relied on free e-mail service, portals benefited from the fact that changing one's e-mail address is a hassle: it requires the user to notify friends, family, and co-workers, because most services will not forward e-mail to a new address. OSPs (like AOL) that provided a user's principal e-mail account were especially strong beneficiaries of this switching cost.

Summary. With moderately high network effects, extremely powerful scale economies, and moderately high intrinsic user retention rates, portals are subject to strong first mover advantages and thus to "winner-take-all" dynamics. The short history of the portal business bears this out: AOL, Yahoo!, and MSN have steadily pulled away from the pack of portal contenders, and late-comers like Disney's Go.com and NBCi have never gained much traction.

But why AOL, Yahoo! and MSN? Each story is unique. AOL organized as a vertically-integrated OSP. It developed an easy-to-use, consumer-oriented "walled garden" rich with content and with opportunities for users to interact. AOL then "carpet bombed" the U.S. with a quarter of a billion disks offering free trial service. Users attracted more users as a strong network effect emerged around AOL's chat and instant messaging applications.

Why AOL and not Prodigy, a failed joint venture between IBM and Sears, which had a substantial market share lead over AOL in the OSP business during the early 1990s? Some observers believe that Prodigy failed because it never engendered a strong network effect around chat: its conservative owners wanted to keep the service "family-oriented." They were nervous about the sexual content of many chat room conversations, and put censorship measures in place that alienated users.[49]

[48] Daniel Frank, "Now the Browser Gets Interesting," Business2.0, August 22, 2000, p. 204.

[49] Kara Swisher, *AOL.com,* (New York: Random House, 1998), p. 226.

In contrast to AOL, MSN failed to gain momentum in its first incarnation as an OSP with proprietary news and entertainment content offerings.[50] However, Microsoft adjusted its strategy, relaunching MSN as an Internet portal rather than an OSP (although Microsoft also continued to offer ISP service), and scaling back its investment in content sites in favor of transaction oriented sites like Expedia, Carpoint, and Home Advisor. Microsoft was able to drive traffic to the MSN portal through its control of the Windows desktop and the Explorer browser, and by providing links between the portal and its very strong transaction destination sites.

Why MSN and not Netscape, which had a commanding lead during the early phase of the browser wars and was able, like Microsoft, to benefit from browser users that defaulted to its start page (a portal called Netcenter)? It is beyond the scope of this note to explain Netscape's defeat in the browser wars, but it seems clear that Netscape squandered an opportunity to develop a leading portal because its senior managers viewed the company, at its core, as a *software* business that made money by giving away browsers and charging companies for server applications. Having "mooned the giant," in the words of researchers Yoffie and Cusumano, Netscape was consumed by its competition with Microsoft: most of its energy went into its browser and server software development and marketing efforts. [51]

Finally, Yahoo!'s remarkable success is more difficult to explain: the company lacked the intrinsic advantages of an OSP like AOL or a browser provider like Microsoft. Still, Yahoo! did execute brilliantly in terms of both site design and brand marketing: users appreciated Yahoo!'s fast loading pages and the clear comprehensive organization of its directories. They also identified strongly with the company's friendly but slightly irreverent brand image.

Why Yahoo! and not other early movers in the search and directory business, such as Excite, Lycos, AltaVista, and the failed Magellan? Again, each story is idiosyncratic. As should be apparent from the analysis in the previous section, Lycos has fared reasonably well: we might simply speculate that the company executed its "Get Big Fast" strategy successfully, but not quite as well as Yahoo!. AltaVista, by contrast, stalled in part due to resource constraints at its parent company, the struggling mini-computer manufacturer DEC. Excite, after it merged with cable modem service provider @Home, suffered from the fact that AT&T (@Home's largest investor, and the largest owner of U.S. cable systems) had made a public commitment to avoid developing Web content businesses. AT&T had made this commitment in order to secure regulatory approval for its cable acquisitions; AT&T's mergers had faced a flurry of challenges from companies like AOL and Disney, who feared that AT&T would deny them access to its broadband infrastructure.

From this analysis, we might conclude that GBF was a smart strategy for Web portals, but that the question is now moot, because the portal wars are over. Perhaps this is true: it seems unlikely that a full-frontal assault on the leading general interest portals—like the attack launched by Disney—would be able to dislodge AOL, Yahoo! or MSN from their commanding positions. However, the GBF strategy is still quite relevant for companies aspiring to develop portals for new access technologies, as explained in the next section. Furthermore, some "Portals with a Wrinkle" have been following GBF strategies and have been able to gain Web users at remarkable rates during 2000. For example, CBS-backed iWon, which runs cash give-away sweepstakes for users who click through iWon's content and commerce offerings, grew rapidly following its October 1999 launch and had become the 21st most heavily trafficked U.S. website with 10 million unique visitors in October

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[50] David B. Yoffie, "Microsoft Goes Online: MSN 1996," HBS Case: 798-019, November, 1997; David B. Yoffie, "Microsoft Goes Online: MSN 1997," HBS Case: 798-035, January, 1998; David B. Yoffie, "Microsoft Goes Online: MSN 1998," HBS Case: 798-035, May, 1998; David B. Yoffie, Michael G. Rukstad and Carl Johnston, "Microsoft--2000," HBS Case: 700-071, April, 2000.

[51] Michael A. Cusumano and David B. Yoffie, *Competing On Internet Time: Lessons From Netscape and Its Battle With Microsoft* (New York: FreePress, 2000).

2000. Likewise, Google, which received its first venture capital funding in June 1999, exploited its superior search technology to grow rapidly: it had 6.5 million unique visitors in October 2000 (making it the 45th largest U.S. website) and had licensed its technology to Yahoo! and other websites.[52] Google was projected to reach profitability by the second quarter of 2001.[53]

Developing Portals for New Online Access Technologies

> *I think we're now quite early in the building of the Evernet, this always-on, high-speed, ubiquitous, multiformat Web. There are really six Webs, and only one of them is deployed now—that's the PC Web. And last I checked there were only 180 million users of it out of six billion people on the planet. Then there's the voice Web, and I mean literally voice, as in Tellme. There's the hand Web for handheld devices like Handspring or Palm, There's this broadband Web, where by the end of the year seven million U.S. homes will be getting ten megabits of two-way Internet access for $30 or $40 a month. There's also the video Web, which you can see in the video servers from TiVo, Replay, and Geocast. And finally there's the eWeb, which is machine-to-machine communication. So I think there will be just as much innovation in the next ten years as there has been over the past few.*
>
> — John Doerr, venture capitalist, Kleiner Perkins[54]

As John Doerr's comments indicate, the Web portal wars are likely to be replayed as several new online access technologies are deployed over the next several years. In each case, new technology will broaden the availability and capability of existing content, commerce, and communications offerings, and will make many new offerings available. Hence, consumers will need assistance finding relevant offerings: they will need portals. These new technologies include:[55]

- *Broadband Internet Access to PCs*, provided through cable modems, digital subscriber lines (DSL), satellite and terrestrial broadcasting, and microwave technologies. The dial-up modems that most consumers use to access the Internet today are poorly suited for the delivery of broadband content—e.g., video, music, large software and data files—for two reasons. First, their speed is limited to 56 Kbps. Second, the Internet's point-to-point architecture is inherently inefficient for the delivery of information that is consumed by multiple parties: a separate, identical data stream has to be dedicated to each recipient. Cable modems, DSL, and certain wireless technologies relax the first constraint by providing "fatter pipes" in the "last mile to the home." Datacasters such as Geocast address the second constraint by using over-the-air technologies to broadcast broadband information to many users simultaneously, using hard disk drives to cache the information at the user's PC for later retrieval.

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[52] Traffic data for iWon and Google from MediaMetrix.com; launch dates and background information from company websites.

[53] "Tech is Still the Growth Industry," Fortune, November 27, 2000, p. 95.

[54] Ibid.

[55] For cases pertaining to these new technologies see Thomas Eisenmann, Chris Darwall and Liz Kind, "Geocast Network Systems, Inc.," HBS Case: 801-211, October 4, 2000; Thomas Eisenmann, Dan Green and Doug Rogers "Teledesic," HBS Case: 800-057, February, 2000; Dan Green, Lynda Applegate and Jay Light "The Last Mile of Broadband Access", HBS Case: 800-076, January 25, 2000; and Thomas Eisenmann, "Tele-Communications, Inc.: Accelerating Digital Deployment," HBS Case: 899-141, August 11, 2000.

- *Interactive TV,* available through cable and satellite system operators, will provide consumers with: 1) greater control over TV viewing choices, e.g., the ability to request programs on demand; smart agents that automatically record (again, onto a local hard disk drive) programs likely to be of interest; and 2) access to the full array of content, commerce, and communications services available over the Internet. Marketers are especially interested in the ability to integrate interactivity into traditional TV advertisements. For example, a "Tell Me More" icon might appear during a TV ad for a new car. Clicking on that icon would allow the viewer to immediately access additional information on the car (and perhaps book a test drive) or store such information in a video mailbox for later retrieval.

- *Wireless data delivery* is now available to cell phones and personal digital assistants (PDAs). Such services rely on screen displays to deliver e-mail and an array of time- and location-sensitive information and commerce offerings, such as airplane departure updates, news headlines, and stock trading.

- *Voice recognition services* provide the same type of information as wireless data providers, but do so over regular telephones through a voice interface instead of relying on keyed input and screen output.

Across all of these technologies, two strategic issues consistently confront companies that aspire to build portals. First, are the dominant portals likely to be developed by *incumbent Web portals* (e.g., Yahoo! or AOL), *communications carriers* (e.g., cellular telephone service providers, cable system operators), *hardware/software providers* (e.g., PDA or video game console manufacturers; "middleware" software developers), or *pure play startups?* Second, should companies develop portals as open platforms or as "walled gardens," with a limited selection of proprietary content and restricted abilities to interconnect with users served by competing portals?

Likely Winners

New access technologies vary in the extent to which they allow consumers to choose a portal. In some cases, consumers may have a limited range of choices, because portal services are inextricably bundled with access hardware or communications services. For example, a mobile telephone service provider may program a wireless data start page into the phones it provides to its subscribers, and may not allow subscribers to reprogram a different start page. In that event, the only way to use a different portal is to switch mobile phone service providers. In other cases, consumers may have unrestricted choice with respect to the portal they use. For example, voice recognition services rely on ubiquitous telephone equipment and "plain old telephone service" (POTS), so switching portals is simply a matter of dialing a different telephone number.

Although consumers may have restricted choice in the examples above, there is still an issue as to who will provide them with portal services, because communication carriers and equipment providers can outsource this function (often to the highest bidder), rather than develop their own portals. The advantages and disadvantages of companies who might develop dominant portals for new access technologies, are described below.

Web Portals. The leading Web portals all have embraced "anytime, anywhere" strategies; they believe it is their Manifest Destiny to meet their users' information needs, in any location, through a wide array of electronic media. Users seem likely to value the ability to access their e-mail, calendars, and time-sensitive information (e.g., stock portfolio quotes; favorite sports teams' scores) from a single source through a range of devices; such an approach would minimize redundant data entry and would allow for "follow me" services, such as cell phone alerts notifying the user of a flight

cancellation after that user had booked a trip through a Web travel service. With their central position on the Web, horizontal portals such as Yahoo!, AOL, and MSN seem well positioned to deliver on this "anytime, anywhere" promise. They have strong relationships with tens of millions of users, as well as relationships with the dozens of content and commerce partners whose offerings populate their portals.

The leading Web portals have taken steps to extend their franchises to each of the new technologies mentioned above. For example, MSN has announced plans to offer DSL service bundled with a broadband version of its portal and browser, with special features exploiting broadband's "always on" capabilities. AOL acquired Time Warner in part to secure access to its cable systems, and plans to use this vertical linkage to develop interactive TV services. Yahoo! and AOL have dueled over prime position on the list of wireless data services that Sprint offers to its mobile phone subscribers. Yahoo! and AOL also have launched voice recognition services that make their communications and content applications available to users through regular telephones.

Carriers. Communications carriers often market online access services directly to users, and thus have a more direct relationship with prospective users than Web portals. Specifically, cable companies market cable modem service and interactive TV service; local phone companies offer DSL service and voice portal services; and mobile phone service providers offer wireless data service and voice portals. Carriers have several incentives to develop portals: 1) they can earn incremental revenue from advertising and transaction fees, and, in the case of mobile phone carriers, from selling incremental airtime; 2) by providing value-added services, they differentiate themselves from competing carriers; and 3) by providing "sticky" portal applications that require data entry and customization, they lock customers in and thereby reduce churn for their core communications services. However, carriers face certain disadvantages in developing portals. First, they lack skills in programming, interface design, and advertising sales. Second, they lack relationships with content and commerce partners. Finally, some carriers—for example, cable system operators and local telephone companies—are not national in their scope of geographic coverage, whereas many portal applications are subject to network effects. Unless geographically-focused carriers negotiate interconnection agreements with their neighbors, they may fail to exploit such network effects.

Equipment manufacturers. Access equipment providers are sometimes positioned to build portals. This is not usually the case when a communications carrier bundles access hardware into its subscription service, as with cable modems, cable TV set-top converter boxes, or cell phones in the U.S.; in such circumstances, the carrier determines the choice of access hardware and the equipment manufacturer has, at best, a limited relationship with the end user. In other cases, however, access equipment manufacturers market their products bundled with unbranded communications services or rely on POTS for online access. Examples of this approach include Research in Motion's Blackberry PDA and TiVo's personal video recorder, which relies on a phone link to upgrade the recorder's electronic program guide.

Startups. Pure play startups, while lacking the resources and relationships of Web portals, carriers, and hardware makers, have the advantage of being focused and flexible. In certain circumstances, startups also benefit from their neutrality. The managers of Tellme Networks, for example, believe that marketers will want a neutral intermediary (in the words of one executive, a "Switzerland") to aggregate their voice recognition services. Thus, eBay will want its voice-enabled auctions to be available through a voice portal, but it will not be comfortable if that voice portal is run by Yahoo! or MSN, which each offer competing Web auctions.

Walled Garden or Open Platforms?

Regardless of who emerges as the dominant provider of portals for new access technologies, companies that develop such portals will need to decide whether to build walled gardens or more

open platforms. There are strategic, economic, and ergonomic arguments for and against walled gardens.

Strategic arguments. Strategically, if a company can deny users the ability to interconnect with users of competing portals, it may engender a stronger network effect that yields competitive advantage. For example, imagine that consumers come to value the ability to instant message their friends as they watch the same TV show. Cable operators might decide to block instant messages from subscribers to direct-to-home satellite broadcasting services (which compete directly with cable in its core television programming business), to encourage households to subscribe to cable. Of course, this tactic can backfire if: 1) it alienates consumers; 2) it fragments usage over several technologies, so none of them offers a compelling network to consumers, and as a result all the technologies stall; or 3) a competing technology follows suit in refusing to interconnect, and gains stronger momentum.

Strategic benefits may also accrue to technology providers who employ walled gardens to advance a proprietary standard. The network effects previously described in this note have all been *connectivity-based.* A second category of network effects are *software supply-related;* such effects often are present when standards govern the creation of new hardware and/or software. When software supply-related network effects are strong, the propagation of a standard leads to the creation of more software that employs the standard, which in turn leads to the further propagation of the standard, and so forth. Sony Playstation would be an example: rapid growth in the sale of Playstation consoles encourages game developers to write for that platform (because the platform requires the development of specialized code that cannot be readily "ported" to another gaming hardware platform), which in turn supports additional console sales, etc.

In the same way, companies offering interactive TV applications may benefit from software supply-related network effects. Creating such applications is likely to be expensive: companies cannot simply re-purpose their text-rich websites for display on televisions, because the display resolution of TV monitors (designed to be viewed from across the room) is much lower than the resolution of PC monitors. Content providers and marketers will only undertake the expensive task of developing new applications for interactive TV portals that they expect to achieve broad reach. Given that constraint, companies who wish to develop the dominant interactive TV portals might seek to do so by attempting to create a widely used proprietary standard for content creation and delivery.

While as yet there is no common industry standard for interactive TV applications, some of the other new access technologies described above rely on open standards. For example, industry participants have negotiated a standard called Wireless Application Protocol (WAP) for the transmission of wireless data, and another called Voice Extensible Markup Language (VXML) for formatting and delivering voice recognition services. In such cases, the option of relying on a walled garden to propagate a proprietary standard obviously is not available. When the option is available, limiting access to a platform in order to win a standards battle is a high stakes game—and one where players with national scope (such as leading Web portals or technology providers able to negotiate agreements with multiple access providers) have a clear advantage over regionally-focused players (such as cable or local phone companies, who would need to stitch together consortia to offer national reach).[56]

Economic arguments. Economically, if "real estate" on a portal is scarce, then a portal may maximize its revenue by auctioning tenancy to the highest bidder. The counter argument is that

[56] See Thomas Eisenmann and Alastair Brown "Networked Utilities," HBS Case: 801-309, January 2000 for more on standard battles.

consumers value choice, and may be disinclined to adopt a portal that deliberately restricts its range of content and commerce offerings.

Ergonomic arguments. Finally, walled gardens seem better suited to certain new technologies on ergonomic grounds. For example, users who rely on cell phones to receive wireless data face serious input and output constraints. The screen on a cell phone often displays no more than nine lines of data, and the twelve small keys are poorly suited for entering the equivalent of website URLs. Thus, wireless data providers may actually improve the user experience by offering a limited selection of services. Since wireless data services are most likely to be used to retrieve a narrow range of time- and location-sensitive information, it should not be too difficult to populate a walled garden either. Furthermore, much of the required information is of a commodity nature (e.g., stock quotes; news headlines), so restricting consumer choice in terms of providers should not be problematic.

Exhibit 1 Top Categories by Audience Reach

Category Name	Monthly Unique Audience (millions)	Reach %	Visits Per Person (per month)
Search Engines/Portals	74.4	88.8%	5.5
Telecom/Internet Services	51.3	61.2%	3.0
Entertainment	49.0	58.5%	2.1
News & Information	41.2	49.1%	2.2
Shopping	40.5	48.3%	2.1
Electronics & Software	39.6	47.2%	2.1
Online Communities	36.9	44.0%	2.4
Directories/Classifieds	28.6	34.1%	1.6
Family & Lifestyles	26.3	31.4%	1.7
Finance/Insurance/Investment	24.9	29.7%	2.8
Corporate Information	23.8	28.4%	1.5
Sweepstakes/Coupons	21.8	26.1%	3.3
Travel	20.4	24.3%	1.4
Adult	20.1	23.9%	1.6
Education	18.6	22.2%	1.5
Government/Non-Profit	15.9	18.9%	1.8
Sports	12.5	14.9%	2.7
Automotive	10.1	12.0%	1.4

Notes: Unique Audience = The number of different individuals that visit a given type of website over the course of the month.
Reach = The percentage of online individuals that accessed a given type of website over the course of the month.

Source: Adapted from *Nielsen Net Ratings*, June 30, 2000.

Exhibit 2 Top 10 Web Sites by Audience

Property	Unique Audience (millions)	Reach %
AOL Websites	48.1	57.3%
Yahoo!	44.8	53.5%
MSN	33.2	39.6%
Microsoft	30.1	35.9%
Lycos Network	22.8	27.2%
Excite@Home	20.6	24.6%
GO Network	18.1	21.6%
AltaVista	12.8	15.3%
Time Warner	12.7	15.1%
NBC Internet	12.1	14.5%

Notes: Unique Audience = The number of different individuals that visit a website over a specific period of time.
Reach = The percentage of online individuals that accessed a specific website over a specific period of time.

Source: Adapted from *Nielsen Net Ratings*, June 30, 2000.

Exhibit 3 Horizontal Portals Comparison: Operating Statistics

Property	Unique Audience (millions)	Reach %	Page Views (millions)	Visits Per Person	Pages Per Person	Time per Person
"Big Three":						
AOL Websites	48.1	57.3%	2,197.4	7.0	46	0:29:23
Yahoo!	44.8	53.5%	5,575.6	8.3	124	1:07:04
MSN	33.2	39.6%	2,853.2	8.4	86	0:48:23
"Also Ran":						
Lycos Network	22.8	27.2%	998.1	3.3	44	0:16:40
Excite@Home	20.6	24.6%	943.1	4.4	46	0:27:29
GO Network	18.1	21.6%	669.8	3.7	37	0:22:58
AltaVista	12.8	15.3%	420.8	3.6	33	0:14:58
"Portals With A Wrinkle":						
Ask Jeeves	8.4	10.0%	162.5	2.5	19	0:11:05
GoTo.com	5.8	6.9%	49.7	2.1	9	0:04:35
Google	3.1	3.8%	78.6	3.2	25	0:08:22

Notes: Unique Audience = The number of different individuals that visit a website over a specific period of time.
Reach = The percentage of online individuals that accessed a specific website over a specific period of time.
Page Views = The number of times a Web page is requested over a specific period of time

Source: Adapted from *Nielsen Net Ratings*, June 30, 2000.

Exhibit 4 Percentage of Total Traffic and Ad Revenue for Categories of Ad-Supported Sites

	Traffic		Ad Revenue	
Companies:	**1999**	**2004E**	**1999**	**2004E**
AOL/Yahoo/MSN	15%	20%	45%	40%
Other Broad-Based Portals	5%	1%	20%	3%
Vertical Portals	20%	24%	24%	32%
Rest Of Web	59%	55%	11%	25%

Notes: "Other broad-based portals" include AltaVista, Snap, Excite, Go, and Lycos.

Source: Adapted from Charlene Li, "The parting of the portal seas," Forrester Research, December, 1999.

Exhibit 5 Comparison of Registered vs. Non-Registered Visitors

	My Netscape	Netscape	My Yahoo!	Yahoo!
Breakdown:				
Unique Audience (millions)	1.4	9.1	2.4	20.6
Pages/Person At Portal	77	19	238	58
Hours/Person At Portal	1.7	0.4	3.8	0.8
Total Hours Online Per Person	12.6	9.2	12.6	7.9
Percent Of Total Online Time Spent:				
At Portal Listed Above	13.7%	4.4%	30.4%	9.6%
At MSN	0.7%	1.5%	1.7%	2.0%
At Go Network	1.1%	2.6%	1.4%	2.0%

Source: Adapted from "Metrics" section, *The Industry Standard* (June 14, 1999): 102.

Exhibit 6 Portal User (Dis)Loyalty—June 2000

Percentage of primary site's users that also visited the secondary site(s):

Primary site	Secondary Site: AOL.com	Yahoo.com	MSN.com	Lycos.com	Excite.com
AOL.com	100.0%	50.9%	33.9%	18.2%	13.0%
Yahoo.com	46.2%	100.0%	45.4%	21.8%	16.6%
MSN.com	40.4%	59.5%	100.0%	21.7%	16.5%
Lycos.com	54.0%	71.2%	54.0%	100.0%	26.7%
Excite.com	47.4%	66.7%	50.7%	32.9%	100.0%

Notes: For example, 59.5% of those people who visited MSN.com during June 2000 also visited Yahoo.com.

Source: Adapted from *Nielsen Net Ratings*, June 30, 2000.

Exhibit 7 Performance of Portal Banner Ads

	Cost (CPM)	Click-Through	Sell-Through
"Run of site" banner	$5-$25	0.1%-1.0%	2%-5%
Keyword banner	$20-$50	1%-5%	2%-10%
Sponsorship/co-branded pages	$30-$100	3%-20%	2%-10%

Source: Adapted from ABN Amro, "Internet Portals," June 2000, pg. 58.

Exhibit 8 Terms of Selected Portal Deals

Company	Portal	Date	Price	Term
CDNow	Yahoo!	8/97	$3.9 million	1+ years
CBS Sportsline	AOL	10/98	$23 million	3 years
CNET	AOL	2/99	$14.5 million	2.5 years
eBay	AOL	3/99	$75 million	4 years
Drkoop.com	AOL	7/99	$89 million	4 years
1-800 Flowers.com	AOL	9/99	$37 million	4 years

Source: Adapted from Michele Slack, "Portal Tenancy Deals," Jupiter Communications, July 25, 2000, p. 4.

Exhibit 9 Lycos and Yahoo!: Profit and Loss Statements

$ In Millions, % Of Revenue	1999		2000		2001E	
Lycos:						
Revenues	$198.2		$349.2		$525.7	
Cost of Revenues	37.5	(18.9%)	59.5	(17.0%)	87.9	(16.7%)
Gross Profit	160.6	(81.0%)	289.7	(83.0%)	437.8	(83.3%)
Operating Expenses	173.9	(87.7%)	255.7	(73.2%)	362.7	(69.0%)
Sales and Marketing	110.0	(55.5%)	170.0	(48.7%)	235.1	(44.7%)
Product Development	38.7	(19.5%)	54.7	(15.7%)	80.6	(15.3%)
General and Administrative	25.1	(12.7%)	31.0	(8.9%)	46.9	(8.9%)
Operating Income (loss)	(13.3)	(-6.7%)	34.0	(9.7%)	75.1	(14.3%)
Yahoo!:						
Revenues	$588.6		$1,084.7		$1,490.0	
Cost of Revenues	92.3	(15.7%)	154.6	(14.3%)	217.4	(14.6%)
Gross Profit	496.3	(84.3%)	930.1	(85.7%)	1,272.6	(85.4%)
Operating Expenses	308.4	(52.4%)	518.2	(47.8%)	696.9	(46.8%)
Sales and Marketing	209.0	(35.5%)	366.7	(33.8%)	500.0	(33.6%)
Product Development	64.1	(10.9%)	96.8	(8.9%)	129.1	(8.7%)
General and Administrative	35.3	(6.0%)	54.7	(5.0%)	67.8	(4.6%)
Operating Income (loss)	187.9	(31.9%)	411.9	(38.0%)	575.8	(38.6%)

Note: Years refer to calendar year-ends.

Source: Adapted from Jeffrey Fieler and Manuel A. Hernandez, "Lycos, Inc.," Bear Stearns, October 17, 2000, pg. 84; Jeffrey Fieler and Manuel A. Hernandez, "Yahoo!, Inc.," Bear Stearns, September 29, 2000, pg.83.

Exhibit 10 Yahoo!'s Financial Targets

	Current Guidance (1)	Bear Stearns Long-Term (2)
Gross Margin	85%	86%
Sales & Marketing As % Of Sales	35%	14%
Product Development As % Of Sales	10%	6%
General & Administrative As % Of Sales	5%	4%
Operating Margin	**35%**	**62%**
Tax Rate	38%	38%

Notes: (1) = Management's guidance to Wall Street on likely economics for the next 12-18 months.
(2) = Expected performance to be achieved between 2010 and 2025

Source: Adapted from Jeffrey Fieler and Manuel A. Hernandez, "Yahoo!, Inc.," Bear Stearns, September 29, 2000.