

## Interview with Hemant Bhargava on “The Business of Google”

**ANALYST:** From a humble beginning, within a decade, Google has grown into one of the most recognized brands in the world. How do you perceive this phenomenal rise?

**Bhargava:** Google’s rise is indeed phenomenal. In fact I’d say that Google became a phenomenon within just 3-5 years of its beginning, not 10. But, many other technology companies have experienced rapid growth, including Cisco, Oracle, Microsoft, all of whom became major players within a short time span. In the Internet arena, MySpace, YouTube, and FaceBook acquired tens of millions of users within just a few years.

Now, within the technology world, very rapid growth curves are not terribly surprising for products that experience “positive network effects” – where the user’s value for the product rises with the number of users (for example, if a lot of people I know use Skype for computer-to-computer voice/video communication, then I will have greater value for Skype). When the number of early adopters crosses a threshold, the product suddenly becomes attractive to lots of other non-adopters – not because of its features alone, but because the “network benefit” is now quite high. As more people adopt the product, the network benefit increases even further and attracting the next batch of fence-sitters, and so on. This logic holds for other products such as FaceBook that we use to interact or network with others. So one can expect very rapid adoption for network goods, due to this virtuous cycle of positive network effects.

What makes Google’s rise especially astonishing is that it happened so fast even though Google’s primary product (search) is not, at least on the surface, a network good. That is, the value of Google search, for me, doesn’t have much to do with whether you are using Google or Yahoo or MSN. So it really was quite a feat for Google to have become a very popular search engine very quickly. Today, Google has over half of the search market, and receives over 50,000 search requests per minute! Google has rapidly become a globally recognized brand for the quality of its product, and for the number of its users, despite lacking the advantages of positive network effects.

**ANALYST:** What according to you, lies behind this feat?

**Bhargava:** Well, I think it’s a combination of a few things. First, some serendepity ... at Stanford in the 1990s, both Sergey Brin and Larry Page (later, founders of Google) were interested in data mining and

large-scale computing. Now, at that time, designing search engines was about “information retrieval” techniques (a fairly traditional area in Computer Science), but Brin and Page’s interests led them to an innovative way for building large-scale Web search engines, specifically to the very successful concept of “popularity ranking” (intuitively, a web page has a high *PageRank* if a lot of other web pages refer to it). Second, Google adhered to a core, basic principle of information systems design: KISS (“Keep It Simple, Stupid.”). Google’s search interface was, and is still is, one of the best examples of simple, elegant, uncluttered design. Just compare the 1999 versions of the search start pages of Yahoo! (then the established player) and Google (the newcomer), and Yahoo’s search start page today (please see Figure). While this might look like a minor thing, it illustrates the elegance and clarity in all aspects of Google search technology. Third, Google developed innovative ways of putting thousands of PCs to work together, which enabled them to deliver great search performance (how quickly you got your search results). Fourth, they had better “crawling” technology so a Google search covered more pages than anybody else. So, all of these things put together ensured that Google had a very high quality, arguably the best, search product. This enabled them to capture market share from the established incumbents at the time. In fact, one might argue that the reason Google has not captured the *other* half of the search market, is simply “lock-in” effects: some people choose Yahoo! search or MSN search simply because they are wedded to Yahoo! or MSN for other purposes (e.g., Internet portal or operating system).

But there is a second, key, aspect of Google’s phenomenal rise. Google actually makes money (lots of money) due to Internet search, even though it charges its users nothing. Google makes its money from advertisers, who value the user traffic that Google brings in: these advertisers pay Google for the right to appear prominently (as “sponsored results”) alongside the main search results. This is where Google was able to take *advantage* of network effects. Google actually serves two sets of markets (or networks): advertisers and searchers. Advertisers clearly value a search engine that has lots of search users, so here we have a positive network effect. But, users do not necessarily like more ads, creating a possibility for a “negative network effect” here: if so, the search engine’s efforts at increasing advertising revenue will conflict with their goal of attracting more users. The pioneers of search advertising – such as GoTo.com, Overture.com, and then Yahoo.com – matched advertisers to search results based purely

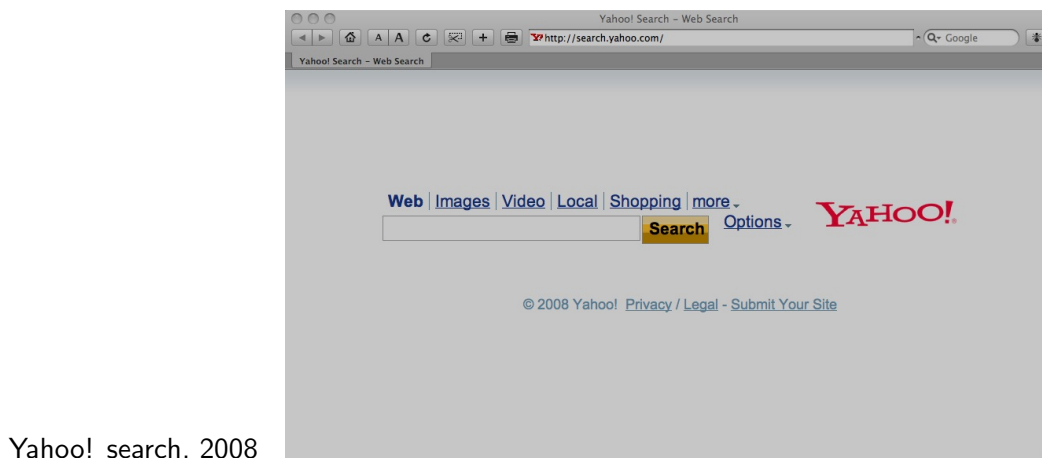
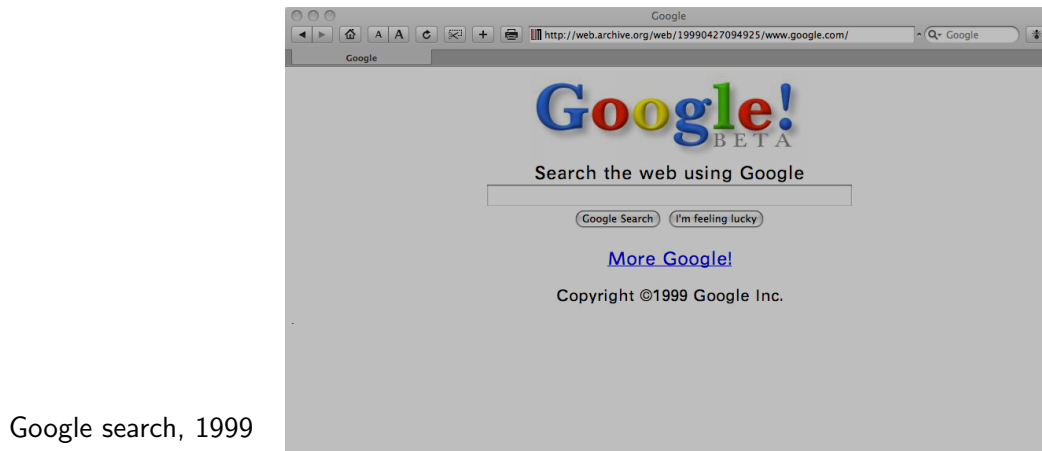
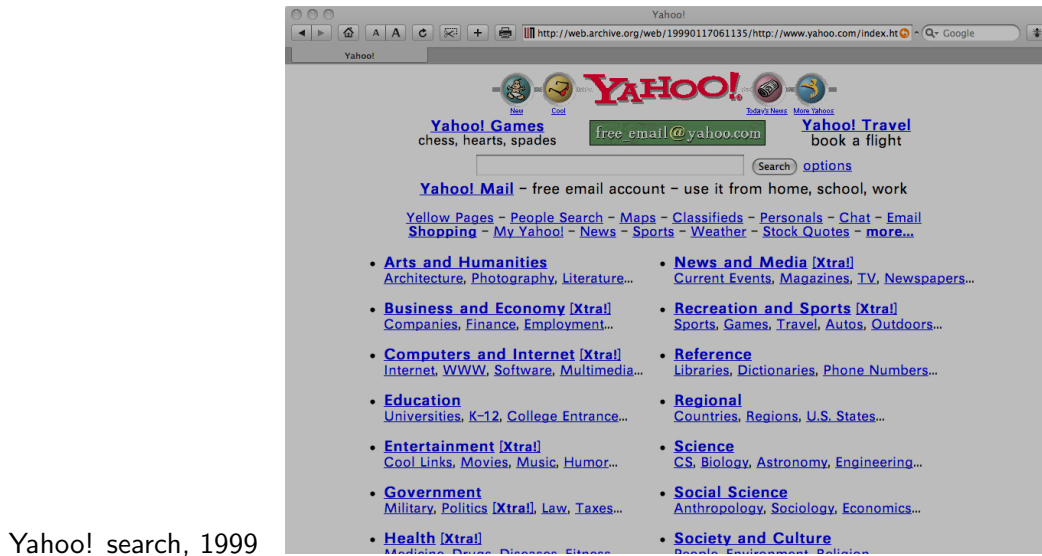


Figure 1: Search start page of Yahoo! and Google in 1999, and Yahoo! search in 2008.

on how much the advertisers bid per click for the search word. This promoted advertisers who were not too relevant to the user, and the net result was the publisher earned lower overall revenue per display opportunity despite selling to the highest bidders. Google, on the other hand, was able to make the network effects kick in positively due to its innovative approach for allocating and choosing advertisers. For each search query, Google chose advertisers based on a product of their bid price and their estimated relevance (which, as a good search engine, Google was able to compute quite well). This ensures that Google's sponsored results are, relatively speaking, quite good and relevant to your search. And therefore having more advertisers actually creates more value for users - and of course generates higher profits for Google.<sup>1</sup>

**ANALYST:** What are the challenges the company is facing now?

**Bhargava:** Well, for one, the challenges of a relatively mature company. Growth is harder to achieve when you've already captured a big chunk of the market. Other firms (especially in the media and advertising industries), who saw Google as partners, now see them as competitors. Talent is harder to come by and harder to retain. For example, Google was the place to work a few years ago, but now some Google workers have started leaving for younger firms such as FaceBook. And, the one big thing a lot of observers criticize Google for: it is a one-trick pony. Nearly all Google's revenue comes from search advertising. So, if there is a downtrend in advertising or the overall economy, as is happening now, Google might be hit quite adversely.

**ANALYST:** How do you see the future of Google in the next decade?

**Bhargava:** Well, who knows? Ok, there are two categories of possibilities, the more predictable ones, and the surprises.

First, I think Google will continue to do quite well in its core business. Unlike the obvious view of Google as a search engine company, I actually think that Google is really a company that has a new approach for managing advertising: that is, how to select and price and place the "correct" ads next to other content. One of the core, back-end, products of Google is its computerized system that runs the online, continuous, real-time auctions for the selection, allocation, and pricing of ads against search

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<sup>1</sup>The technical details of these two allocation approaches are described in one of my publications ("Implementing Sponsored Search in Web Search Engines: Computational Evaluation of Alternative Mechanisms", in the *INFORMS Journal on Computing*, with a version available on SSRN.com).

queries. This is quite a revolutionary approach compared to the way advertisements are priced and sold for newspapers, magazines, radio, or television. So, I would expect Google will leverage its core competence towards running the business of advertising in this broader playground of traditional media. Another evolutionary step for Google would be to move from text search to multimedia search (imagine, you could input a piece of music or an image or video, and get back corresponding search results in those forms).

Second, Google is not a one-trick pony. There are a number of experimental products that Google has been developing – mostly kept under wraps or, at least until now, not monetized. Examples are Froogle, Google Scholar, Google Books, Checkout, Google Earth, Google Apps, etc. Many of these services are notable not necessarily for the end product, or for how much market share Google has captured, but for the technology that lies under the hood. Someday Google might choose to capitalize on these technologies. Even more than that, there are the innovations Google has made in order to become a successful search/advertising company. For example, as I mentioned earlier, Google has excelled at how to obtain high-performance computing out of thousands of simple, inexpensive PCs, something that demonstrates prowess in areas such as distributed systems, networking, and parallel computing. Google has one of the best approaches for energy management for their server farms. Energy is going to be one of the biggest issues facing the IT industry, and Google might well be able to make a business out of this expertise. Put all these things together, and you might even see Google emerge as a provider of integrated network-based computing services. Or, consider Google's recently introduced browser, Chrome. Chrome is much more than a Web browser: it is a potential operating system and it offers Google a powerful way to gather data about user behavior, both of which create new revenue possibilities.

**ANALYST:** What kind of strategies is Google pursuing to uphold its business?

**Bhargava:** I'm not quite privy to all this, but Google is certainly becoming a little more mature and a little more aggressive, and perhaps even a little more traditional – in how it manages its business, in how it deals with financial analysts, etc. And as I mentioned earlier, Google is also quietly developing a diversity of intellectual property, which could be tapped for commercial purposes if necessary. I understand Google is also developing political clout which is necessary, for example, to maintain its

commercial and strategic interests (e.g., in dealing with the continuing browser wars – how users get their default Web browser which becomes the gateway to various monetizable activities).

**ANALYST:** Any other comments?

**Bhargava:** I think Google and a number of other technology companies (before and after Google) offer us academics an exciting new laboratory and playfield for studying new business and competitive strategies that are unique for technology companies – network effects, platform competition, business models, etc. As a University in California, and near Silicon Valley, we have a particular interest in this area. I teach an MBA course called “Competitive Strategies in Technology Industries” at UC Davis, and I look forward to more companies such as Google!

## **about Bhargava**

Dr. Hemant K. Bhargava joined the Graduate School of Management at UC Davis in Summer 2003, and also holds a joint appointment as Professor of Computer Science. He has previously worked at the Naval Postgraduate School, Carnegie Mellon University, and Penn State University. Dr. Bhargava studied in India - at Delhi University and the Indian Institute of Management - and did his doctoral work in Decision Sciences at The Wharton School, University of Pennsylvania. Hemant’s current research is in the economics of information systems, and covers pricing, product design, marketing and operations for IT-intensive products and networks. He has also done extensive work in the design of computer-based modeling languages and decision technologies. He has also worked and consulted with several leading technology companies and government/military institutions. His work has appeared in *INFORMS Journal on Computing*, *Management Science*, *Information Systems Research*, *Journal of Management Information Systems*, and *IEEE Computer*. His research on DecisionNet won Best Paper Awards at leading Information Systems conferences. Dr. Bhargava was awarded the Menneken Prize for Excellence in Research at the Naval Postgraduate School in 1998.