

The Internet: Still Wide Open and Competitive?

Eli Noam¹

**Professor of Finance and Economics; and
Director, Columbia Institute for Tele-Information
Columbia Business School**

March 2004

1. The Question

For years now, the Internet seemed to be open, free, and competitive. Entrepreneurialism was high, financing easy, and entry barriers were low. But now, in the wake of the Internet's bursting bubble, the reality of that competitiveness deserves a second look: is the Internet still as open and competitive as it used to be, or is it becoming concentrated and dominated by a few firms with market power? And what are the implications of a greater concentration of the Internet?

To even ask this question often raises emotional responses, so deep is the self-image of openness and competitiveness, in contrast to the stodginess of telecom, print, and TV industries.

Some participants in the Internet have difficulty even with the concept of looking at it as an industry. And it is true that the early phases of the medium were dominated by government, universities, and non-profit entities, all operating outside the market. Even when the Internet became commercialized it was frequently asserted that the bit economy operated on fundamentally different principles than the atom economy. Today, a more balanced

¹ An earlier version of this article appeared as a publication of the Oxford Internet Institute. Research assistance by Joost van Dreunen and other research assistance by Janelle Benjamin are gratefully acknowledged.

We will also provide an analysis that encompasses a very broad definition and includes

We looked at the market concentration trends for these seven core Internet-sector industries in America. For each of these industries, we tracked revenue and calculated individual firms' market shares in this particular industry for a period of 20 years. The resultant database is unprecedented in its scope.

The geographical market definition is national, for the US. A global market definition would be misleading, since a company, e.g. an ISP can (and often does have) a big share in a particular country but not globally. Conversely, a local or regional market definition would not be appropriate for the seven countries listed above, since they are mostly national in scope with the firms national players. Where regionalism of firms is a factor for broadband and for small ISP's this has been adjusted to provide the national average of market competition that exists regionally. Given the controversy surrounding issues of media concentration we have aimed for the methodology to be simple and transparent.

These market shares were then used to calculate concentration indices and to track them over time. The major concentration index used was the Herfindahl-Hirschman Index ("HHI") used by the US Department of Justice.²

² A second index is also used primarily to cross check the HHI. The "C4" index is the combined share of the top four firms in a market.

$$C4_j = \sum_i^4 s_{ij}$$

Where: S_i = firm's i market share of a given industry j , with firms are ordered by size of market share.

Where j = an industry

m_j = total revenue of an industry

S_i = each firm's market share of an industry

n = number of industries in a specific subset of the information sector

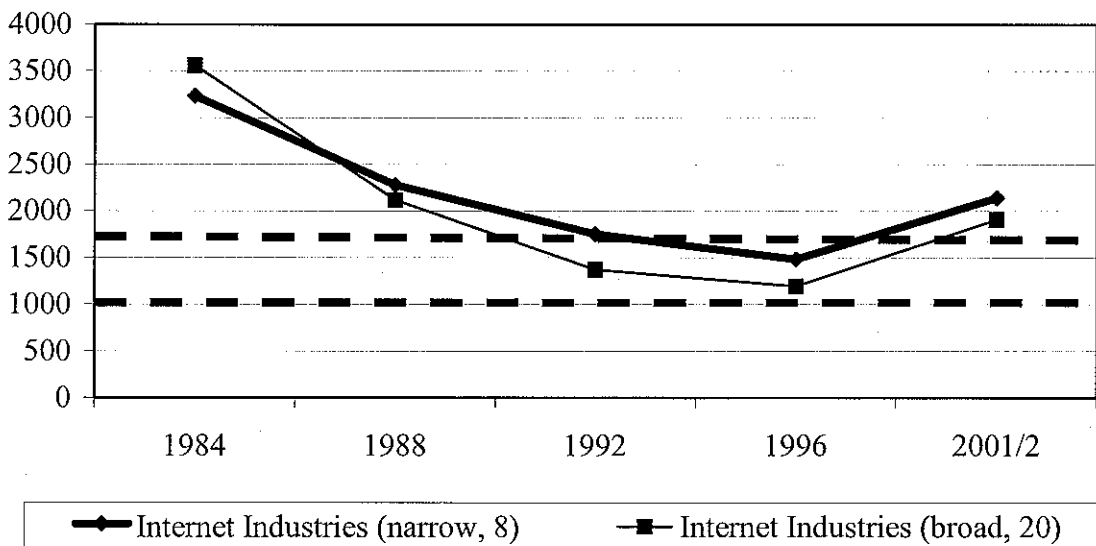
f = number of firms in an industry

3. Findings

The findings are provided in Graph 1. They show that:

- (a) the Internet sector's overall concentration has never been low
- (b) it is today in the highly concentrated range
- (c) concentration declined in the 1980 and into the mid 1990s, but in the mid 1990s it increased again, forming a U-shaped curve. (similar U-shapes exist for ISP's, backbones, portals, browsers, internet workings equipment.

Graph 1. Concentration of Internet Industries



The findings are interesting: the newer the medium, the more concentrated it is, and often, the more its concentration has been rising in recent years. Thus, print media are relatively unconcentrated, and rising only slowly. Film, Broadcasting, and New Media, the next entrants, are more concentrated in the chronological order in which they emerged. Most concentrated are the Internet media, especially Broadband, the newest of media. What might be the reasons? Most likely it is the large capital requirement that increases from one media generation to the next, and which is associated with economies of scale on the supply side and network effects on the demand side. This leads to increasing riskiness, and instability for the newer media, and the consequent attempt to stabilize them by concentration and oligopoly.

5.2 Internet vs. Other Information Sectors

A second comparison is of the Internet with three other major segments of the information sector: Telecommunications⁹; Mass Media¹⁰; and information technology (IT)¹¹. Graph 3 shows the concentration trends.

⁶ “Broadcasting” includes: TV Prime Time Production, Radio Stations, TV Stations, Radio Networks, TV Networks, TV Syndication.

⁷ “New Media” includes: Home Video, Video Rental, DBS Providers, Cable TV Operators, Cable TV Channels, Cable TV Set Top Converters.

⁸ Local Broadband Providers.

⁹ “Telecommunications” includes: Local Service, Long Distance, International Service, Mobile Telephony, Radio Dispatch, Paging, Cordless Handsets, Corded Handsets, Fax Machines, Mobile Handsets, PBX, Central Office Switches, Multiplexers, Internetworking Equipment, Fiber Optical Cables, Copper Wire & Coax Cables, Microwave Equipment, Cellular Infrastructure.

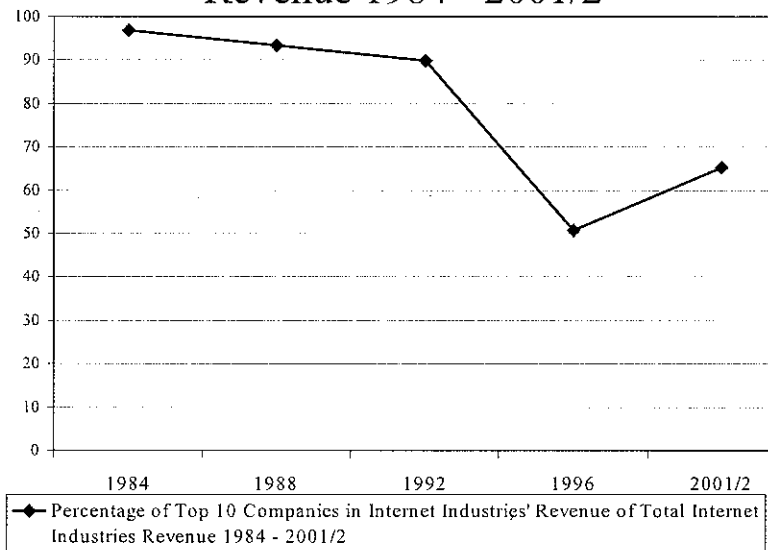
¹⁰ “Mass Media” includes: Radio Stations, TV Stations, DBS Providers, Cable TV Operators, Radio Networks, TV Networks, TV Syndication, Cable TV Channels, Pay TV Channels, Movie Production, Prime Time TV Production, Movie Theater Chains, Home Video Distribution, Video Rental, Daily Newspapers, Magazines, Academic Journals, Educational Books, Trade & Paperback Books, Other Books, Book Retailing, Online Book Retailing, Online Information Services, Printing Services, Music Publishing, Performance Rights, Record Labels/Distributors, Music Retailers, Music Cable Channels.

¹¹ “IT” includes: Computer Memory, MPUs, Microcontrollers, Microcomputers, Workstations, Midrange Computers, Mainframe Computers, Supercomputers, PDAs, Video Game Hardware, Copiers, Storage Devices, Printers, Modems, OS Software, Network OS Software, Enterprise Application Software,

6. Vertical Concentration Trends

Even if a firm does not dominate any specific market, its presence in several markets might, in combination, become powerful. To look at the trends of such concentration, we use three indicators of vertical integration. The first is the “Sector Share Index” which shows the share of the largest 10 firms of the Internet sector in that sector.

Graph 4. Percentage of Top 10 Companies in Internet Industries' Revenue of Total Internet Revenue 1984 - 2001/2



$$SSI_{sector} = \sum_i SSI_{firm_i} = \sum_j \frac{s_j m_j}{M}$$

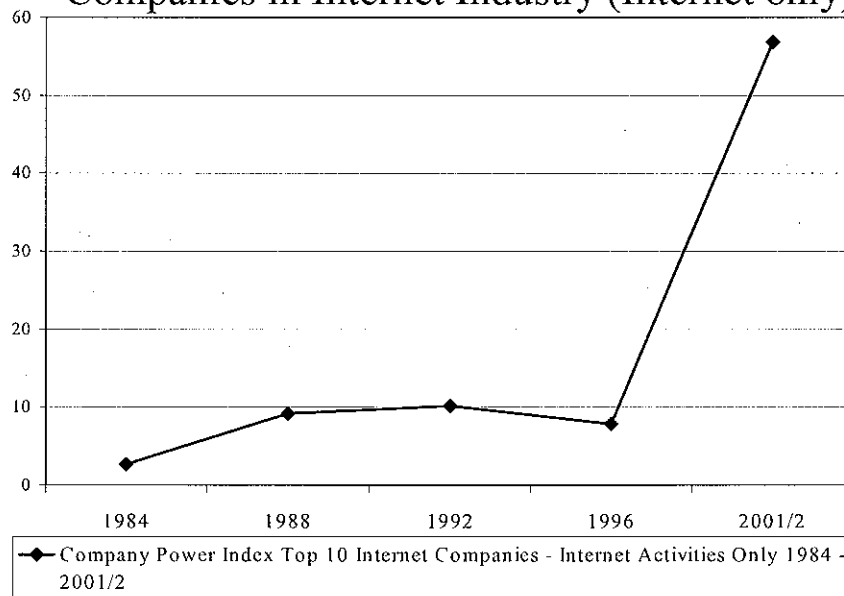
Where:

- s_j = Firm i 's Share in Market j , in percent
- m_j = Market revenues of sub-industry j
- M = Revenues of Total Sector

We are also a third measure of vertical concentration: the “Power Index” (PI), which aggregates the top Internet companies’ HHI scores across the Internet industries.¹²

For examples, if a firm held 10% in the ISP market and 20% in the backbone market, and if the two markets were of equal size, its PI would be $\frac{1}{2}(100+400) = 250$. The results, provided in Graph 6, show a pronounced upward rise in such an index, indicating increases in firms’ shares, and their increased participation in multiple internet industries.

Graph 6. Company Power Index of Top 10 Companies in Internet Industry (Internet only)



7. Interrelation

What are some of the factors leading to higher concentration in the Internet’s industries?

Each of the seven sub-industries has a different story. But the common elements are high

$$^{12} CPI_{industry} = \sum_i CPI_{firm_i} = \sum_i \sum_j \frac{s_j^2 m_j}{M}$$

Where:

- s_j = firm’s share in market j
- m_j = total revenue of sub-market j
- j = sub-industries, ranging from 1 to 95 (consisting of the 95 sub-industries)
- M = Revenues of total information sector
- i = Firm i of main Internet firms

(b) access by content and applications providers, unless they, too possess countervailing market power.

4. Cross-subsidies within major Internet firms from segments with market power to segments that are more competitive, distorting competition.
5. The emergence of some forms of regulation to deal with such power.

Of course new waves of innovation will periodically break up existing firms' market power.

But following such a shake-up, the same dynamics will still be at work, and lead again to consolidation and concentration among the survivors and successful newcomers.

If the Internet becomes dominated by a few firms, and given its centrality to commerce, culture, and politics, it is not likely to be left alone by regulation. Earlier debates over the opening of cable-provided Internet access are an early example. Others are likely to follow.

Hence, the core of the Internet might, in the long term, move from an entrepreneurial and libertarian model to one of market power and of regulation resembling or even exceeding that of several other electronic media.

These findings and conclusions may not fit the Internet's self-image of being wide-open and competitive, but business strategies and public policies will benefit from a realistic view of the data rather than from a wishful assessment.