

**IT'S NOT ONLY WHAT YOU INFORM - IT'S ALSO WHERE YOU DO IT:
THE LOCATION OF PRODUCTION, CONSUMPTION AND CONTENTS
OF WEB INFORMATION**

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Abstract

This paper aims at an initial addressing of questions of location of supply and demand for web information, and at a discussion of possible interrelationships between location and contents. Three questions are discussed. First, is global web information produced in a completely location footloose pattern? Second, is there a relationship between centers of information production and leading areas of consumption? Third, is there any relationship between the location factors of web information production, on the one hand, and contents of web information, on the other?

Crude measures of information production in U.S. cities show a concentration in New York, San Francisco, and Los Angeles. Leading areas of consumption include the Silicon Valley and various other areas of high-tech industries and universities. Information on the web is most varied, led by scientific/educational sites and sex-related ones. The specialization of urban centers of website production in finances has not led to high percentages of such sites on the web. Web information production is an independent industry driven by global demand, enjoying the expertise and experience of the hosting cities in multimedia and telecommunications. These elements may assist the centers of web production in the future in keeping at least qualitative leadership.

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The emergence of cyberspace through Internet in the 1990s has brought about a global spread of demand for all types of information, at easily and reasonably-priced access, at least in developed countries. Marketing and urban geography notions such as "service areas", "catchment areas", "influence areas", "central place hierarchy", and the like, relating to the location of customers *vis-à-vis* a store or service provider disappeared with the instant distance-free access to electronic information from anywhere to anywhere. In principle, such elimination of location rules could have been true not only for information consumption, but also for information production, and it is probably so as far as e-mail, notably personal one, is concerned.

It is more questionable, however, whether global electronic information, consisting of websites of various kinds, notably commercial ones, is produced too in a completely location footloose pattern. Furthermore, if the production of commercial electronic information is more concentrated, is there any relationship between the location factors of web information production, on the one hand, and the type or contents of information produced in given centers of information production, on the other. And to put supply back in line with demand, one may ask whether a local specialization in information production brings about also a lead in information consumption in that place.

This paper aims at an initial addressing of these questions of location of supply and demand for web information, and at a discussion of possible interrelationships between location and contents. The following elaboration will mostly focus on U.S. cities with some reference also to London and Tokyo, given both the supremacy of the U.S. in the production of electronic information, and the availability of data (see Kellerman, 1997).

Information classification

There are various ways to classify information at large, and electronically transmitted one in particular. One most basic classification is by form: text, data, graphics, voice, and picture. This classification has lost much of its significance through the introduction of Internet, which has become an electronic medium permitting integrative transmissions of information in every form through a single channel, transforming all information forms into electronic signals (see Kellerman, 1997).

Another simple classification of information has focused on information transmission, separating among information producers or senders, transmission media or telecommunications channels, and information receivers or users. However, as far as the web system of Internet is concerned, information may be produced and installed on the system, but not necessarily consumed. In other words, if nobody calls for a certain site, it will neither be transmitted nor received or used. Thus, electronic information has to be classified into designated and undesignated. Designated information is information which is transmitted to specific individual receivers (such as phone calls or fax transmissions) or to specific audiences (e.g. CATV), whereas undesignated information is put on a transmission device (i.e. a host), and potentially received by any number of users.

An alternative classification would look at electronically transmitted information as something that does not stand for itself, but is rather woven into the wider context of social and economic life, and thus may either be free of charge or involve a price for its use or purchase (see also Zook, 1998). Four types of information may thus be recognized:

(1) Pure information: Personal, academic, and some business information, in form of e-mail, or website information provided at no charge (other than for its transmission), and with no intention to create or promote purchases. Thus, some of this information is designated (e-mail), and some is not (websites).

(2) Information as part of sale processes: Information transmission over the Internet has often become part of the sale process of both products (e.g. books) or services (e.g. airline tickets). This type of information is undesignated in most cases. However, it may turn designated, once purchase is made (e.g. order confirmation or

progress reports). Such types of information are currently part of the marketing systems of almost all material products, as well as of many services.

(3) Information as product: Information itself may be sold over the Internet (e.g. astrological forecasts) to any undesignated customers. Here too, once a sale has been executed, the information transmission becomes designated.

(4) Products transformed into information: Probably the only real product transformed into electronic information is also the most powerful one - money. Capital as a resource or as a product is currently transmitted almost exclusively over telecommunications channels, not necessarily over the Internet. The transmission of capital is obviously highly and most clearly designated.

The transmission of pure information through voice telephony as of 1876, and later on of text and graphical transmission through fax (type 1), paved the way for the transmission of capital in form of data as of the 1970s (type 4). The construction of dense domestic and international telecommunications networks facilitated the evolution of the Internet as of the late 1980s-early 1990s, so that electronic information could be integrated into sale processes (type 2), and information itself could be sold (type 3). The emergence of Internet has enhanced the transmission of pure information and capital, which could now be transmitted also in more sophisticated ways.

Location factors of Internet production

Information production has been viewed as indispensable to urbanism, and even more so to growing globalization (see e.. Sassen, 1997). Moreover, "cities are driving, rather than simply participating in, information-based phenomena such as the expansion of the Internet" (Moss and Townsend, 1997, p.47). It is questionable, however, whether this driving is equal for all cities of similar size, or whether certain past specializations of specific cities bring about leadership in Internet production in them. Leadership in the production of Internet sites may rise out of a city's previous specialization in finances, high-tech, and/or media.

The interrelationship between finances and information in general, and between global finances and telecommunications in particular, has long been very intense. Historically, "the ability to collect, exchange, rearrange and interpret information is the most persistent characteristic of an international finance center" (Laulajainen, 1998, p. 257). And as far as the adoption of telecommunications is concerned: "there is little doubt that the electronic integration of [these] financial and capital markets represents the single most important application of telematics within the global economy" (Graham and Marvin, 1996, p. 144).

The extensive reliance of contemporary banking on telecommunications could have brought about a globally most dispersed financial industry. However, global financial markets in the era of telecommunications have rather become more concentrated, under the leadership of New York, London, and Tokyo, simultaneously combined with a globalization of customers. This concentration has been attributed to external economies of scale, demand for skilled manpower, need for face-to-face communications, and the ability to instantly liquidate (Brealey and Ireland, 1993). A global financial center, equipped with a dense and sophisticated telecommunications infrastructure, as well as the local existence of financial tradition and manpower experienced with information handling, may yield a strong specialty in information production *per se*.

The second economic specialization which may lead to specialization in Internet production is the high-tech industry. This industry is too a heavy user of telecommunications, given the very nature of its activity and the geographical spread of both R&D and customers. However, the requirements of high-tech industries for a sophisticated telecommunications infrastructure are lower than those of a global financial center. The major contribution of a locally concentrated high-tech industry to a specialization in Internet production lies in its manpower, as well as in the local immediate availability of Internet-related technological innovations, thus providing for a local leading edge in a constantly dynamic industry.

The third local economic specialization which may lead to specialization in Internet production is the media, notably visual ones, such as TV, movies, etc., especially when developing through the world of advertising into multimedia. This economic activity may provide the expertise required for the design and structure of

Internet websites.

The location of Internet production

Differences in the volumes of electronic information production of all types among cities may follow city ranking by population size or the urban hierarchy, thus representing information production by both households and businesses. Data on local and intercity telephone calls are withheld by the telephone companies, thus preventing direct measurements of information flows (see e.g. Graham, 1997). Mitchelson and Wheeler (1994) used Federal Express data to rank U.S. cities in the generation of information at large (Table 1). Not surprisingly, this order generally follows the hierarchy of urban centers by population size. By the same token, the ranking of those U.S. cities included in a 1998 international ranking of 25 cities by a composed index for pricing, choice and availability of sophisticated telecommunications services, reveals again the urban hierarchy of population size and economic activity at large (Finnie 1998) (Table 1). Pricing in that survey included the costs of international calls, local private lines, and mobile communications. Choice referred to the number of companies offering selected services, such as frame-relay and fiber optics, and availability related to various advanced services (such as dark fiber and ISDN).

Ranking Internet web activity in U.S. cities is more complicated, since one would like to differentiate between Internet information production and Internet information consumption. It is extremely difficult to measure the size of produced information and its consumption, other than by crude and approximating measures. Crude measurements for such production and consumption may be obtained by using data on the number of Internet domains and hosts respectively, as well as by other measurements, such as Internet penetration.

One may assume that any domain represents at least one Internet website if not more. It is, though, difficult to determine the number of sites per domain, as well as the size of the sites by page numbers, which may differ widely among domains. Also, one organization may have several domains. Furthermore, it is assumed that the billing address of domains represents their location, and that the place of information transmission is also the

place of information or web production. All these assumptions and reservations may apply to many domains, but still the identification of leading urban centers in the number of domain names may attest to a concentration of web information production. Since about 85% of U.S. domains are commercial (.com) (Moss and Townsend, 1997), these domains represent the production of Internet information as a commercial product or as part of sale processes (types 2 and 3 of electronic information mentioned above).

The urban location of commercial Internet production is highly concentrated. The combined number of domains, or Internet information production, in New York, San Francisco, and Los Angeles in 1998 was larger than in the 11 following metropolitan areas combined (Zook, 1998). The metropolitan areas of these three cities housed over a quarter of U.S. .com domain names in mid-1998 (9.9% in New York, 8.5% in San Francisco, and 8.2% in Los Angeles) (based on Zook, 1998). In early 1999, the percentage of the global total of domain names for all domain codes (about 5.5 million) located in these three cities reached 7.7% (Los Angeles 3.1%, and New York and San Francisco, 2.3% each) (based on Zook, 1999).

New York, or Manhattan only, is by far the global leader in commercial Internet production. New York was termed "the information capital of the world economy" (Mitchelson and Wheeler, 1994, p. 97). The city has developed over the years three economic specializations based on and creating a tremendous wealth of information in general, and notably electronically transmitted one in the pre-Internet era. These specialties are finances, command and control activities, and the media.

In finances, New York is the largest equity trading market place in the world, comprising one pole of the global triad of leading capital markets, jointly with London and Tokyo. It was a close second to London in 1998 in institutional equity holdings, reaching over \$2 billion (Thomson Financial, 1999) (Table 1). As a leading command and control center it housed in the early 1990s 40 out of the 100 top American multinationals, which generated 55% of the total foreign revenues created by these 100 companies (Mitchelson and Wheeler, 1994). New York served also as the headquarters location of 12 of the world leading corporations in 1997 (second to Tokyo) (Short and Kim, 1999, based on the 1998 *Fortune 100* list), much more than the following American

city, Detroit, with four corporations. However, as Sassen (1991) claimed, this ranking has lost some of its importance in favor of the concentration of business and producer services, in which New York is leading (Short and Kim, 1999). The city is furthermore the largest U.S. concentration of book and magazine publishing, as well as radio, TV and CATV programming (Moss, 1996). All these activities concentrate mainly in Manhattan, notably in its midtown and downtown sections.

It was estimated that 75% of all calls made in Manhattan were to locations within Manhattan (Moss, 1986), thus attesting to the complex web of interactions within the city. Generally it was estimated that the 6% of the U.S. population residing in metropolitan New York produced in 1994 35% of all U.S. outgoing calls (excluding leased lines) (Graham and Marvin, 1996). At the global level of electronic interactions, it was estimated for the late 1980s that New York produced more than a third of U.S. outgoing international telephone traffic, amounting to about 6-8% of the global international traffic (excluding leased lines) (O'Neill and Moss, 1991; Kellerman, 1993). Similarly, 36% of the overnight transfers to FedEx foreign centers in 1990 originated in New York (Mitchelson and Wheeler, 1994).

This striking leadership in communications led to superiority in Internet production, as well. Thus, in 1997 4.2% of U.S. commercial domains were located in Manhattan alone, twice as much as in the second leading center, San Francisco (Moss and Townsend, 1997). Within Manhattan most of this activity was concentrated in Silicon Alley south of 41st St., with notable foci along 5th Ave., TriBeCa, and the Soho (Zook, 1998).

San Francisco is second to New York in the production of Internet information. Nearby San Jose is a leader in itself, sometimes reported jointly with larger San Francisco. Both centers have specialized in computer high-tech industries, notably around Stanford University and the Silicon Valley which has developed in its vicinity. San Francisco has emerged as a leading national and international financial center, even larger than Los Angeles, the third ranking Internet production center (Table 1). In addition, both Los Angeles and San Francisco have developed their media industries: Los Angeles more towards entertainment, whereas in San Francisco the media consist mainly of technology-intensive firms, complementing the high-tech industrial specialization. The

two cities together house some 90% of the California multimedia industries (see Moss, 1996).

Comparing the 1994 ranking of central cities by the number of commercial domains to that of 1997, following New York in the 1994 ranking were San Jose and San Francisco, with Los Angeles ranking 15!. Three years later, in 1997, San Francisco was second, followed by Los Angeles, and Chicago (Moss and Townsend, 1998), and in 1999 Los Angeles turned second, followed by San Francisco (Zook, 1999). This may attest to the superior role of finances and high-tech over the media in bringing about a local specialization in Internet information production. As Zook (1998) was able to show, in both cities, similarly to New York, the Internet industry is geographically concentrated. In Los Angeles, the Hollywood and Santa Monica areas are preferred, whereas in San Francisco, the industry tends to concentrate in the financial district, South of Market (Soma), and the Multimedia Gulch areas.

The tendency of the electronic information industry to concentrate in leading financial centers has been observed in other parts of the world as well. Thus, London, and particularly Central London, were shown to be peaking Internet centers, ranked fourth after the three leading U.S. cities (Dodge and Shiode, 1999; Zook, 1999), and Tokyo was identified as the leading telecommunications center for the Pacific Rim (Alles *et al.*, 1994). Toronto was shown to be the third non-U.S. city among the twenty leading cities in the total number of domain names (Zook, 1999). The opening of the British and Japanese telecommunications systems for competition, immediately following this change in the U.S., was meant to assist London and Tokyo in keeping their leadership in global capital markets, side by side with New York (Kellerman, 1993; Graham and Marvin, 1996). The intensive contacts among the three cities are presented by FedEx data. London received in 1990 one third of its American messages from New York, and Tokyo one fifth (Mitchelson and Wheeler, 1994).

Zook (1998) observed a slight decline in the location quotients of Manhattan and San Francisco over time, and a more significant one in second-tier Internet production centers specialized by their high-tech industries (Seattle, Boston, Washington DC, Austin). He further raised the possibility of future diffusion of Internet production along the urban hierarchy as the industry matures, following product cycle theory. On the other hand,

however, one may identify some similarity between financial centrality and Internet production centrality in various aspects: the very existence of leading centers or the first mover advantage, the global location of customers, the absolute dependence on telecommunications for the transfer of capital and information respectively, and the accumulation of expertise in these centers. Thus, it might well be that the location of the Internet industry will continue its concentration tendency even if there is no significant association between the contents of Internet websites and the more veteran specializations of the cities, such as finances.

The location of Internet consumption

The number of domains per metropolitan area was used for a crude measure of the sizes of urban Internet information economies. When it comes to consumption, the penetration or adoption rates of Internet are called for. One possible measure is the per capita number of hosts. Another possible crude measure of consumption is the Internet penetration rate, jointly at home and at work. Hosts represent the number of computers connected to Internet, and it is possible to assume that most of them are used to consume web information, though a host must also be used for the production and storage of websites in each domain. In January 1999 some 5,491,696 domains existed worldwide (Zook, 1999), and in September 1999 64,177,265 hosts were defined worldwide (Staple, 1999). Thus, taking into account the growth in the number of domains during the first nine months of 1999, there were, on the average, about 10 hosts per domain. For the U.S. for the same period the ratio was even higher, about 12.5, representing wider adoption of Internet. Obviously, the variation in the usage of Internet made through hosts may be sizable (see Moss and Townsend, 1998). Comparing the leading cities in the number of domains (for production) to those areas leading in per capita host density, as well as to the cities leading in penetration rates (for consumption), reveals dissimilarities (Table 1). Cities that specialize in Internet information production do not necessarily lead in information consumption.

In the consumption of information no one of the three largest metropolitan areas, New York, Los Angeles, and Chicago is represented among the top leading areas. This is striking especially as far as New York

is concerned, the city which leads in the production of information at large, and in the availability of telecommunications infrastructure and services, but does not lead in hosts per capita, and is ranked relatively low in the exposure to Internet information. Mitchelson and Wheeler (1994) in their study of Federal Express data noted that New York "talked" more than it "listened", and "listening" is determined, among other things, by socioeconomic levels of city residents.

The leading cities and counties represent mostly areas which specialize in high-tech production or academic study at large. The leadership of Washington represents exposure to Internet at both government and high-tech. The leadership of the San Francisco/San Jose area is most striking, and this area is, thus, the only one that leads in both production and consumption of Internet. It should be recalled, however, that the 1998 household penetration rate of Internet in the U.S. of 28% was still low compared to the penetration rates of 95% and more of telephones TV. The top city in Internet penetration in 1999, Washington, reached a penetration rate of 59.9% of the adult population online at either work or home, and the following four cities on the list reached levels of over 50%, as well (Scarborough, 1999). Rapidly rising adoption rates of Internet may bring about city and county rankings more closer to population sizes, and thus more dispersed. This diffusion of consumption is heavily related to pricing, ease of operation and attraction of the information offered on the web. Obviously, the future spread of demand does not necessarily have to be met by an equal diffusion of Internet information production.

Content demand and location

A possible connection between Internet content and location of production was raised by Zook (1998): "one would expect different types of Internet content based on what activities were already present" (p. 20). It was observed in June 1997 that 40 of the most accessed 100 websites were located in California, a finding which fits the geographical pattern of Internet production (OECD, 1997). What can one guess about the contents of websites? The strong concentration of Internet production and the socioeconomic nature of the leading

consuming areas could have been expressed in sizeable numbers of websites devoted to financial information, high-tech topics and multimedia presentations. In addition, the leading counties in the consumption of the web system may hint to high percentages of websites devoted to academic-educational materials.

In order to examine a possible fit between location and contents, three dimensions have to be examined: the topical distribution of the web; the most frequent terms sought for through search engines; and the most visited sites. The web contained in July 1999 about 800 million pages, with only less than one-half of which accessible through the major search engines (Paltridge, 1999). If the high percentage of domains devoted to commercial sites, 85%, is applied also to the distribution of pages, then a very high majority of the web is commercial. It was estimated that in August 1999 the total number of unique visitors reached 63.1 million, an increase of 11.5% over August 1998 (Media Matrix, 1999).

A recent survey conducted by the Israeli Rivlin company revealed the distribution of web pages at large (both commercial and others) by leading subjects (Table 2). Though this distribution relates to pages produced worldwide, the web is still heavily dominated by the U.S., with 54.6% of the total number of domain names in early 1999 being American (Zook, 1999), and 68.9% of the hosts located in the U.S. in September 1999 (Staple, 1999). Another estimate divided the worldwide 56.2 million Internet hosts in mid-1999 into 60% American, and 40% in the rest of the world (MIDS, 1999).

The richness of the web is extremely wide since the twelve most popular topics accounted for only one third of the pages, and since sex, the most popular subject, reached only 5% of the total number of pages. Finances, the most important telecommunications-associated activity and the most striking one in the three Internet production centers, is not included among the 12 leading subjects. Education, which relates well with several of the leading counties of Internet consumption, ranks second. Computers and advertising, the two closest topics to high-tech and multimedia respectively close the list, with each having just about one quarter of the number of pages devoted to sex. Between August 1998-August 1999 the most growing category in terms of site visiting was shopping (35%), followed by travel (29%), with sex growing the least (4.6%) (Media Matrix, 1999).

Websites devoted to high-ranking cities, though relating more to travel and tourism than to business, include only one of the three leading centers of Internet production centers, New York, and only as third (4.58M pages), following London (6.1M pages) and Paris (4.6M pages).

Another recent study focused on the contents of the circa 15-18% of the non-commercial web information (Lawrence and Giles, 1999) (Table 3). Obviously, most of the subjects are different from those of the web at large, which consists of an overwhelming commercial information; they are less entertaining, and more of interpersonal and "serious" nature. However, three subjects appear on both lists: education, health and sex. Educational/scientific materials lead the non-commercial list with 6%, compared to just 4.5% on the general list. This difference may be attributed to different measurement methods: the Rivlin rather general survey used search engine information inflated for the whole system, whereas the Lawrence and Giles study examined the contents of a sample 2,500 servers. In general, sex and scientific materials compete as leading subjects on the Internet, attesting to the wide spectrum of information on the system. Obviously, most of the materials on sex are commercial, which is true also for health, though at lower proportions.

It is possible to assume that Internet serves as an information medium by all scientific disciplines. The leading counties of consumption, typified by high-tech concentrations of both industries and universities, may hint to either a more extensive use of the system by the high-tech industries, or to a higher volume of information in high-tech related sites compared to those of other disciplines.

Most common terms searched for on major search engines have an even wider distribution. However, the 25 most searched terms on Alta Vista comprised only 1.5% of all queries (see Paltridge, 1999). Normally, the various websites which provide information on the most frequently searched terms are censored to exclude terms of sexual content. However, a leaked list of the most searched terms on Yahoo in October 1996 put the word "sex" in the first place with 1,553,420 searches, followed by the word "chat", with just one quarter of the searches for "sex", 414,320 (Eyescream, 1997). In this list 60% of the 200 leading terms had a sexual connotation! One other list (claimed to be uncensored) ranked in October 1999 the following terms by decreasing

order: mp3; sex; hotmail; yahoo; pokemon; warez; ebay; jokes; chat; britney spears (Searchterms, 1999). A third list ranked in the same month as leading terms: pokemon; halloween; dragonball Z; britney spears; WWF; Pamela Anderson; NFL; Beanie Babies; Backstreet Boys; Poetry (Lycos, 1999). Thus, it is for sex, music and entertainment to lead the most searched terms.

The most accessed websites are search engines and other "general purpose" sites. Thus, for August 1999, the top ten websites were all .com sites, ranked in decreasing order: Yahoo; AOL; Msn; Geocities; Netscape; Go; Microsoft; Lycos; Excite; Hotmail. Of these, only one related to travel and another one to e-mail. Only in the 13th rank appeared a more specific site, Amazon.com (Media Matrix, 1999).

The contents of the Internet and its consumption patterns attest to a most diversified system geared foremost to leisure activities led by sex, interpersonal communications, travel, music, and shopping. Secondary to these activities are educational-academic materials. Finances, the leading economic activity in the centers of Internet information production, is not among the leading types of produced or consumed Internet information, even though it may lead in data and telephony telecommunications. Data occupy already over one-half of the telecommunications traffic in the U.S. Computers are also not in the lead, whereas the media are represented, at least in form of music sites. In other words, in terms of its contents the Internet industry is driven by a global most dispersed demand, independent of the "economic contents" of its centralized production centers, and this despite its young age. The system depends on complete freedom and commerciality, marketing to global markets.

This content-independent industry is, though, dependent on both physical and human infrastructures and the cumulative advantage offered by the production centers. Finances, as the leading economic activity in the production centers, was the most natural activity to lead to Internet information production, because of the heavy telecommunications infrastructure available in financial centers, as well as the telecommunications expertise available in these centers. Similar traits are offered by specializations in high-tech and the media.

Conclusion

Web information production has been presented as an industry driven by demands for most varied types of information. One may also safely assume that the location of these demands will continue to globally disperse.

It is thus intriguing to speculate on the possible continued leadership of the three leading centers of production, New York, San Francisco, and Los Angeles.

The percentages of domain names, as well as any other measures of web information production in these centers may decline with the geographical diffusion of consumption, which still has a long way to go in order to reach universal adoption. However, the coexistence of the three specializations, finances, high-tech and multimedia in different mixes in the three leading centers, may suggest a continued leadership of these centers, though differently than the continued centrality of financial markets in a globally telecommunicated world. This leadership may find its way in qualitative rather than quantitative forms, through the production of rather complex and sophisticated sites, as well as in the pioneering of technological and service innovations, based on the local long and extensive specializations. It is pretty easy to transfer website drafts and design ideas between producers in one of the three centers and clients located anywhere, using a variety of instantaneous electronic media, whereas the face-to-face daily contacts among experts in the industry may be possible only in big and well-specialized urban centers.

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Table 1 : Information rankings of U.S. cities

Financial target cities, 1998 (1)	Telecommunications Services, 1998 (2)	FedEx items shipped, 1990 (3)	Number of domain names, 1998 (4)	Hosts per capita per county, 1997 (5)	Internet penetration, 1999 (6)
New York	New York	New York	New York	San Mateo, CA	Washington
Boston	Chicago	Los Angeles	San Francisco	Santa Clara, CA	San Francisco
San Francisco	Los Angeles	Chicago	Los Angeles	Fairfax, VA	Austin
Los Angeles	San Francisco/San Jose	Washington	Chicago	Washtenaw, MI	Seattle
Philadelphia	Atlanta	Boston	Boston	St. Louis, MO	Salt Lake City
Chicago		Dallas/Ft. Worth	Washington	Middlesex, MA	Los Angeles
Denver		Philadelphia	Philadelphia	Travis, TX	Boston
Houston		San Francisco	Dallas	San Francisco, CA	Chicago
Hartford		Atlanta	Miami/Ft. Lauderdale	Hennepin, MN	New York
Minneapolis		Miami	Atlanta	Fulton, GA	Philadelphia
Baltimore/ Washington		Houston	Denver		
Newark		San Jose	San Diego		
Atlanta		Denver	Houston		
		Minneapolis	Minneapolis		
		Detroit			

Sources:

(1) Thomson Financial, 1999.

(3) Mitchelson and Wheeler, 1994.

(5) MIDS, 1997.

(2) Finnie, 1998.

(4) Zook, 1998.

(6) Scarborough, 1999.

Table 2: The most popular subjects on the web, 1999

<u>Subject</u>	<u>Number of pages (in millions)</u>	<u>%</u>
sex	42.6	5.0
education	36.8	4.5
music	34.7	4.2
management	32.0	4.0
health	26.7	3.3
travel	20.2	2.5
manufacturing	20.0	2.4
entertainment	15.0	1.8
shopping	12.0	1.5
food	12.0	1.5
computers	11.8	1.4
advertising	11.0	1.3
<u>Total</u>	<u>274.8</u>	<u>33.4</u>

Source: *Ma'ariv* (1999).

Table 3: Subjects on non-commercial websites, 1999

<u>Subject</u>	<u>% of web servers</u>
scientific/educational	6.0
health	2.8
persona	2.3
societies	1.8
pornography	1.5
community	1.3
government	1.2
religion	0.8
<u>Total</u>	<u>17.7</u>

Source: Based on Figure 1 in Lawrence and Giles, 1999.