



School of Public Policy

Study on Universal Postal Service and the Postal Monopoly

Appendix G

Section 3

Social, Economic, and Technological Trends

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1 Introduction

In addition to using opinion surveys, public hearings, and stakeholder input, a reasoned projection of the needs of society for universal postal service and the monopolies should include an analysis of broader social, economic, and technological trends. In many cases, the opinions of individual mailers may not provide the best guide to future needs. Individual mailers may be only dimly aware of new technologies on the horizon and their implications. Immersed in day-to-day business, mailers may lack a sufficient historical perspective to project trends into the future reliably. Ten years ago, for example, few people would have been able to describe how the Internet would affect their business activities or daily lives.

This section outlines trajectories of social, economic, and technological trends that may impact the needs and expectations of individuals and organizations regarding universal postal service. There are two main dimensions to this: postal service, and universal service.

First, postal service is interpreted, for the purpose of this section, as a means of communication, specifically a means to collect and deliver information to the public.¹ To use USPS terminology, the mail is a system used for correspondence, transactions, advertising, periodicals circulation (and package delivery).² The factors that impact the need for delivery of this service are *technological changes*. Mail-based communication in that sense is competing with a range of other means, from oral transmission to telephone to electronic data interchange.³ Furthermore, the postal service as a network has always been competing with other networked information and communications technologies (ICT), starting with telegraph, wired telephone, electronic mail, and now wireless telephone and Internet. These alternative means can have similar functions as the mail i.e., to

¹ The exact scale, scope, and value of the universal service obligation and letter and mailbox monopolies are discussed elsewhere in this report.

² The different functions are reflected in the five mail markets defined by the USPS in its Household Diary Study (see USPS (2007) The Household Diary Study. Mail Use and Attitudes 2007. Washington, DC: USPS; p.5).

³ Communication is defined here as an exchange of information and creation of shared meaning between one or more senders and one or more receivers.

conduct personal correspondence, business transactions, advertising, and disseminate the content of magazines and newspapers.⁴

Second, universal service is a feature derived from the fact that the USPS, as an independent establishment of the executive branch of the U.S. government, aims at serving “everyone, everywhere” – to use USPS terminology again.⁵ The exact scale, scope, and value of the universal service obligation and letter and mailbox monopolies associated with this status are discussed elsewhere in this report. For the purpose of this section, it suffices to assume that universal service implies a nationwide reach of its service in terms of population and geography. The factors that impact the need for delivery of this service are *socio-economic changes* in where and how people live and work. For example, highly urbanized areas have different needs than rural populations, and a manufacturing economy is structured differently from a service economy.

Given these characteristics of universal postal service, this section will look primarily at social, economic, and technological trends in commercial communication systems such as the Internet.⁶

This concentration implies the exclusion of several other possible lines of analysis.

First, this section does not look at other public and private sectors that have similar networks and coverage – the Social Security Administration, the Internal Revenue Service, large banking and financial institutions, broadcasting networks, private shipping and express companies and so forth. Individually and collectively, they could provide some of the universal postal services. These industries are also instructive concerning regulatory and deregulatory trends in U.S. economy and policy, including privatization (and very recently also nationalization, in the case of troubled financial sector institutions.)

⁴ In addition to the communication function for personal correspondence, business transactions, and advertising, the postal service has a distribution function, namely the dissemination of print publications (periodicals), and shipping of goods (packages). Except for the latter, there are technological alternatives for these functions. These different functions are also reflected in the five different mail markets as defined by the USPS.

⁵ The scope is implied in the USPS Annual Report glossary: “Universal Service: The Postal Service’s mandate and commitment to the nation to provide mail delivery service at uniform and reasonable rates to everyone, everywhere” (see USPS (2007) Annual Report. Washington, DC: USPS, p59.)

⁶ There are other public and private sectors that have similar networks and coverage – the Social Security Administration, the Internal Revenue Service, large banking and financial institutions, broadcasting networks, private shipping and express companies and so forth. Individually and collectively, they could provide some of the universal postal services. For a discussion of these alternatives see Appendix E on international trends.

Second, this section does not examine demographic trends per se, such as immigration and aging. They are only considered in connection with technology use. Neither does it trace economic phenomena such as booms and recessions, since they generally have little impact on overall shifts in ICT use, even though short-term spending can be affected significantly.

Finally, this section does not deal with the social, economic, and technological trends within the USPS. As a one of the largest organizations in the U.S. with 685,000 career employees, a revenue of 75 billion, and both the largest email system and vehicle fleet in the U.S., the USPS is certainly a microcosm – and often leader – of societal change, economic development, and technology adoption⁷. However, the macro trends reported here aim at providing a perspective on factors affecting individuals and organizations outside the postal service.

2 Methodology

This section uses academic literature as well as secondary statistical data. Most of them were compiled using reports by federal agencies, ensuring a certain degree of comparability and reliability. However, some of those data, especially more recent ones, and those on new technologies, were not collected by those agencies themselves. They use other sources, in particular industry associations and consulting firms. Their validity has not been confirmed independently by the author.

Analyzing statistics over long periods of time poses its own challenges. It can be impeded by a lack of data in selected comparison years, and changes in the relative value of a unit (e.g., number of access lines, or expenditure in dollars). To address this, most tables are normalized by number of households, or gross domestic product.

New technologies and systems in particular are notoriously difficult to measure, especially in the early years of their existence. This is owed in part to classification problems

⁷ See USPS (2008) Postal Facts. Available at <http://www.usps.com/communications/newsroom/postalfacts.htm>. Last accessed August 28, 2008.

when integrating them into traditional survey and census instruments, and in part to some innovating companies' tendency in overestimating initial numbers to create more interest.

It should be noted that this section has been prepared independently of the primary survey research conducted by GMU to determine public needs and expectations. Some findings may thus overlap with that analysis.

3 Development and Diffusion of New Technologies

The development and diffusion of new technologies is often described using the term innovation. In a classical study by Everett Rogers, four groups of people are distinguished.⁸ *Innovators* adopt almost any new idea or technology, and make up 2.5% of the population, followed by *early adopters* who count for 13.5%, an *early majority* and a *late majority* are estimated at 34% each, and finally *laggards* at 16%. Consequently, most innovations have a slow start, diffuse more rapid as adoption increases, then level off until only a small percentage of potential adopters remains.

People can fall into different categories for different innovations, depending on its relative advantage, compatibility, complexity, trial-ability, and observability. For example, a trucker is more likely to adapt a new geographic information system (GIS) than the latest Internet file-sharing application. Likewise, the same innovation can have different rates of adoption in different social groups, depending on previous practice, perceived needs, innovativeness, and social norms.⁹

Societies as a whole have different approaches to technologies, too. The interaction between technological innovation and the social, economic, and political change can be traced back to the earliest inventions. Deborah Spar has traced this for communication technologies, arguing that advances occur in successive phases of innovation, commer-

⁸ Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press. (See also: Rogers, E. M. (1986). *Communication Technology: The new media in society*. New York: Free Press.)

⁹ Ibid; p.170

cialization, creative anarchy, and rules.¹⁰ Discoveries by researchers and explorers acquire commercial value, she claims, which attracts both investors and pirates. The increasing value of innovations to the former subsidizes efforts to suppress the latter. Out of this conflict emerges a legal structure to support a new industry, and the widespread adoption of technology.

4 Adoption of Internet-based Technologies¹¹

The use of communications technologies and media, including mail, varies with socioeconomic characteristics such as age, race, sex, income, and educational attainment. Generally, new technologies tend to be adopted first by users who are younger, professional, or male, before spreading into other population groups, with some groups' adoption rates and times lagging behind significantly. By the mid-2000s, Internet-based communication had become a well-established practice – 74% of all adults had access to the Internet.¹² However, there are distinct patterns in terms of which applications are used for what purpose, as presented in the following two charts:¹³

¹⁰ See Spar, D. L. (2001). *Ruling the Waves. Cycles of Discovery, Chaos, and Wealth from Buccaneers to Bill Gates*. New Haven: Harcourt. Spar uses a broad view of communication technology, from oceangoing ships to the Internet. See also Flichy, P. (1995). *Dynamics of Modern Communication: the shaping and impact of new communication technologies*. London; Thousand Oaks: Sage Publications.

¹¹ The term Internet is used here synonymously with World Wide Web which denotes the hypertext-enabled, most “visible” and popular application of the network of networks that constitutes the Internet. The Internet as a communications system has developed out of ARPANET, a defense and research network beginning in the 1960s. At that point, a small community of users directly contributed to the development of the system. Over time, the system expanded to include users who are more like consumers, meaning passive participants in what in the 1990s became the World Wide Web with its predominantly non-technical and commercial applications. Its underlying protocols, IPv4 and IPv6, provide name and address space for billions of unique network nodes – be they large servers, individual computers, wireless phones, GPS receivers, and even ‘smart’ appliances.

¹² Source: Pew Internet & American Life Project Survey, September 2007. Available at <http://www.pewinternet.org/>. Last accessed August 15, 2008.

¹³ Source: U.S. Census Bureau (2008) The Statistical Abstract 2008. Table 1130. Typical Daily Internet Activities of Adult Internet Users: 2006. Available at http://www.census.gov/compendia/statab/cats/information_communications.html. Last accessed September 20, 2008.

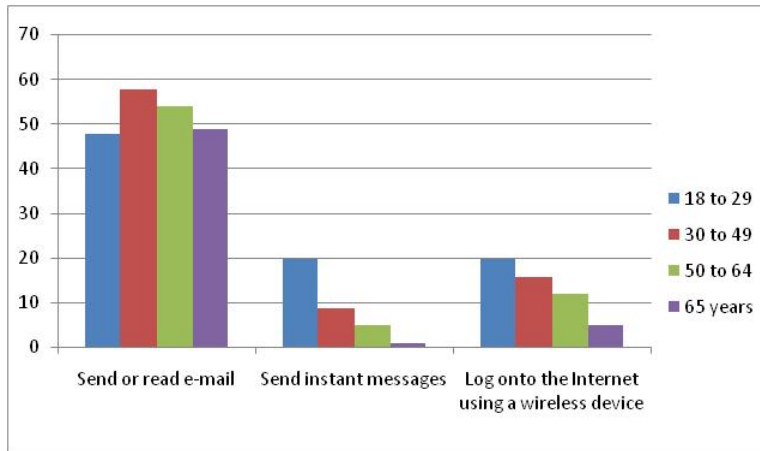


Fig.G3-1. Internet Activities by Age in 2006

The first observation is that more than 50% of all adults over 18 years send or read emails daily, with fairly even distribution between the age groups. Younger users are in fact on the low end of this activity. This is explained by the next statistic, which shows a striking difference in instant messaging, which 20% of people under 30 use daily, while only 1% of people older than 65 use it. Evidently, there is a migration to a new application by a user group likely to be early adopters. An increase in the use of these technologies by more age groups is to be expected in the coming years. The category of mobile Internet use, however, shows a less pronounced gap between the age groups. This indicates that Internet use is becoming device-independent, meaning that it matters less how one connects (with several options now available from dial-up to broadband to wireless, and many cell phones becoming web-enabled), but how one uses the Internet.

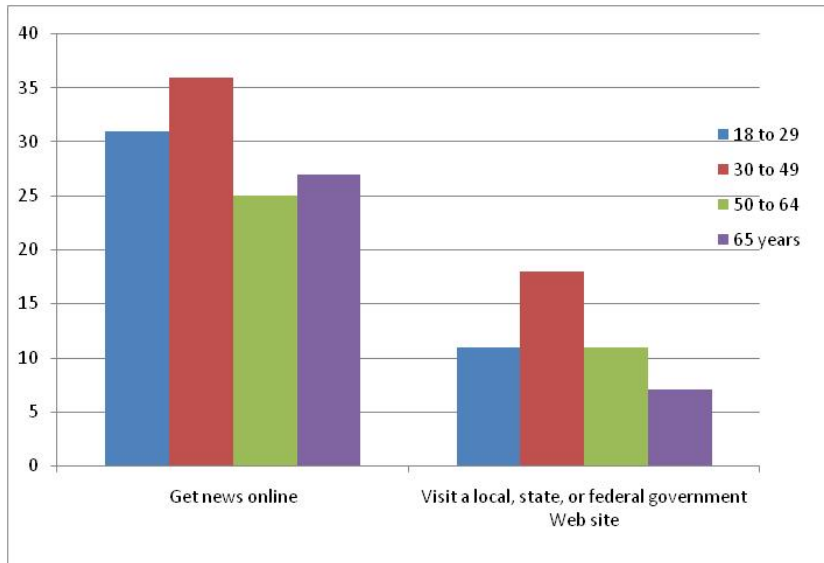


Fig. G3-2. Internet Use by Age in 2006

The two categories here reflect different uses of the web: checking the news has become rather common across age groups, with people under 50 more regular users than those over 50. This trend is likely to continue – an overall rise in online news consumption, accompanied by a rise in the gap between age groups. Visiting government websites is much less frequent, and the distribution less even. Predictions for this particular category are thus difficult.

While intergenerational differences in the use of a particular technology may become less pronounced over time, the initial difference is still significant. A survey by the Pew Internet and American Life projects finds that long-time Internet users first went online for the same primary reason (to communicate with colleagues/friends) they are still using the Internet today, and are now switching to broadband and wireless channels.¹⁴ When asked what their favorite application was at the time they first went online, most said email. This is not much different from what can be observed today, even as the size and demographics of Internet users has changed.

¹⁴ Wells, Tracy (2008) A Portrait of Early Internet Adopters: Why People First Went Online - and Why They Stayed. Washington, DC: Pew Internet & American Life Project, February 6, 2008

The fact that patterns and preferences of in using communication technologies are formed early and remain fairly stable over time will make another growing trend in Internet use likely more significant: online banking.¹⁵



Fig. G3-3. Email and Online Banking 200-2007

Note: Flat lines indicate missing data for a particular year.

Between 2000 and 2007, more and more people have tried transactions over the Internet, in addition to correspondence. This is a significant trend in that not only availability of the technology, but trust in its reliability and security has to be present.

¹⁵ Consumer Choice Survey (September 2007) Princeton Survey Research Associates International for the Pew Internet & American Life Project. Available at <http://www.pewinternet.org/> Last accessed August 15, 2008.

5 Saturation and Substitution Effects

In historical perspective, the saturation times of new ICT vary significantly.

Consider telephone and radio adoption. By 1920, 35% of households had telephones. Then it took until 1946 to reach 50%, and until 1957 to reach 75%, and another 13 years until 1970 to reach 90%.¹⁶ In contrast, radios were in 25% of households by 1926, but it took less than 5 years until 1930 to exceed 50% of households, and by the early 1940, more than 90% had a radio. More recently, 26% of households had Internet access in 1998. From then, it took only until 2001 to reach 50% and until 2007 to get up to 75%.

The reasons for these differences are instructive for all types of communication systems. It can be argued that Internet access initially piggybacked on telephone lines, and thus network expansion was not a factor impeding saturation. Radio transmission and reception required much less physical infrastructure investments than landlines, too. The important lesson for the purpose of this study is that new networked systems can be built faster, if not necessarily cheaper, than previous ones.

As the case of cell phone subscriptions shows, high saturation rate is achieved through a combination of high initial growth rates, combined with less dramatic but steady increases of already high volumes. From 1984 until about 1990, the growth rates were staggering: each, year, the number of subscribers at least doubled – but from a very low level of less than 100,000. Starting in 1996, the growth slowed significantly – by then, 44 million subscribers had already signed up. The market still grows by around 10% per year though, thus increasing the total to 249 million in 2007.

¹⁶ Field, Alexander J. (2006) “Telephone industry – telephones, access lines, wire, employees, and plant: 1876–2000.” Table Dg34-45 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press, 2006

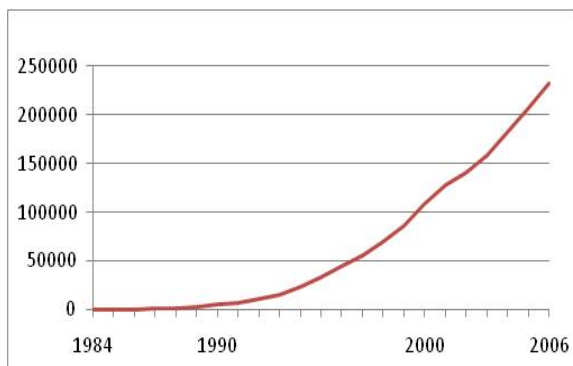


Fig. G3-4. Cell phone subscriptions 1984-2006 (in 1,000)

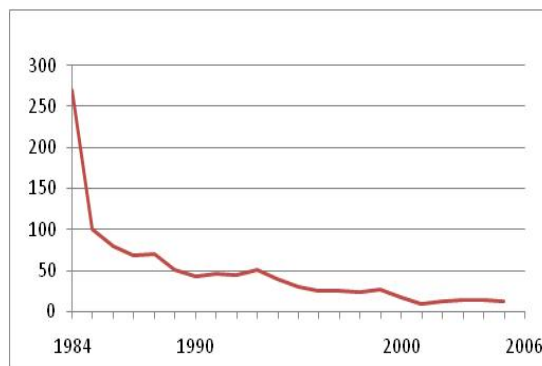


Fig. G3-5. Growth in cell phone subscriptions 1984-2006 (in%)

Finally, long-term comparisons between different ICT show that substitution effects develop over years and decades, rather than manifest in abrupt replacements. In fact, the initial result is a net increase through the use of parallel means. For example, cell phone use increased by 8.5% to a total of 249 million subscribers from 2006 to 2007. At the same time, the number of local (wired) access lines has declined, but only by 5.4% to under 200 million.¹⁷ Also, broadcast radio and TV are not losing ground at all, but have held steady over decades to being used in over 95% of households. However, when compared over the past twenty years, it seems clear that overall, older ICT are slowly but surely losing ground, while new ones increasingly replace them. The following chart illustrates these trends:¹⁸

¹⁷ See FCC (2008) Local Telephone Competition: Status as of December 31, 2007. Washington, DC: Industry Analysis and Technology Division Wireline Competition Bureau. September 2008.

¹⁸ Source: U.S. Census Bureau (2008) The Statistical Abstract 2008. Table 1099. Utilization of Selected Media: 1970 to 2006. Available at http://www.census.gov/compendia/statab/cats/information_communications.html. Last accessed September 20, 2008.

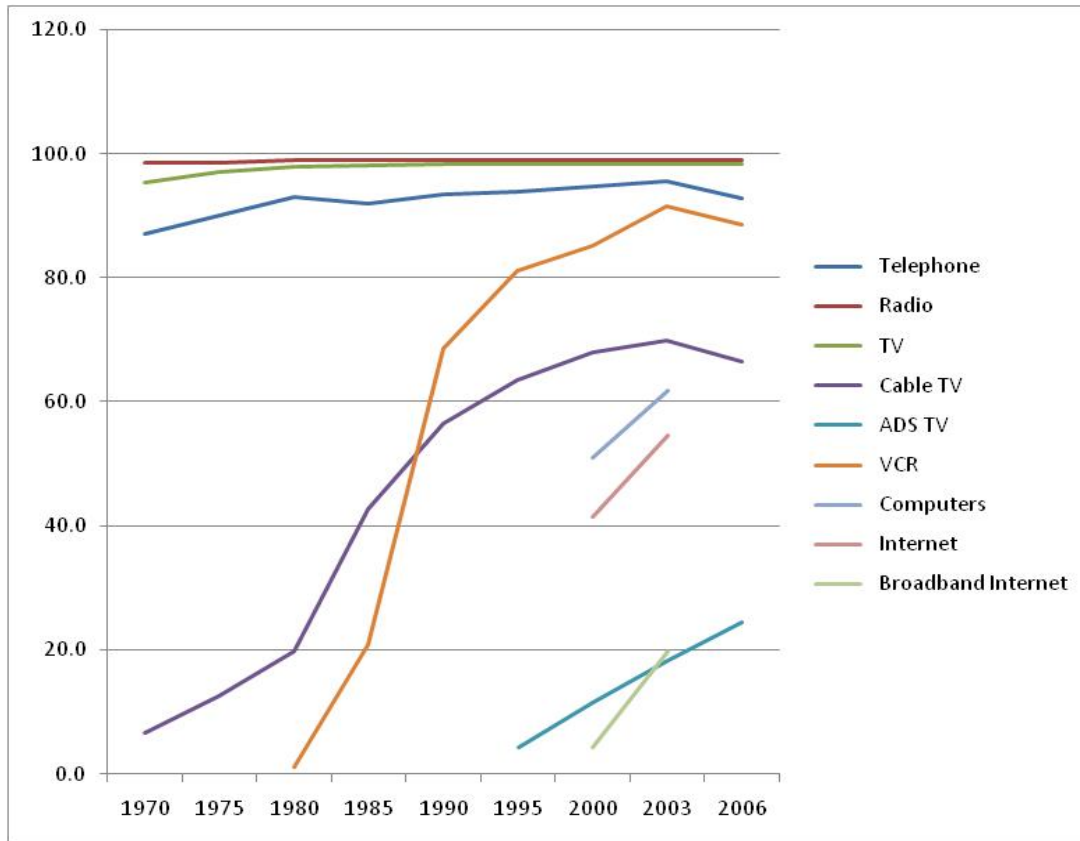


Fig. G3-6. Media saturation in U.S. households, 1970-2006

Note: ADS refers to Alternative Delivery System, at this point mainly satellite TV.

The availability of a certain delivery mechanism in a household does not per se reveal how much they are actually used for communication. The following chart compares message volumes over time, from phone calls to telegrams to mail pieces. While the mail volume trends are still evolving, it appears that telegrams and mail pieces follow a bell shaped curved, whereas phone conversation have continued to grow exponentially. Telegrams reached their peak in the 1930 after a steep incline. However, this was not sustained, and telegrams have virtually disappeared today. Mail volumes have increased much more steadily over a very long time, but seem to be at or near a plateau at this point.

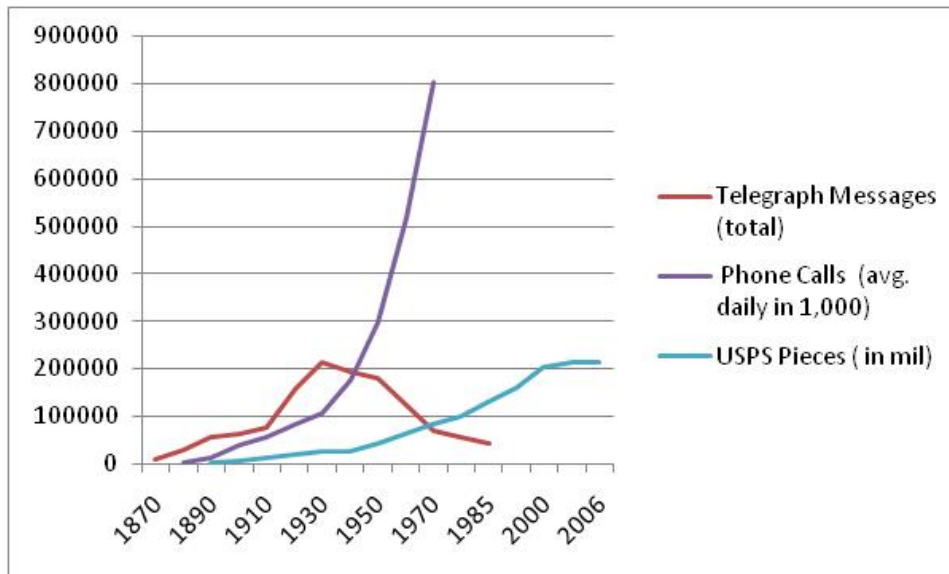


Fig. G3-7. Message volumes selected media 1870-2006

Another aspect that influences saturation and substitution rates is convergence between ICT. Most physical infrastructure networks have the capacity to deliver more than one type of content: Letter carriers can carry parcels, radio towers were used to start television broadcasting, phone lines can carry voice as well as data signals. This technological convergence goes hand in hand with economic shifts in the industry – sometimes as diversification, and sometimes as concentration of providers. Comparisons of these trends by medium or technology tell only part of the story since the regulatory framework determines access to markets, possibility of mergers, and often rate structures.¹⁹ Thus, the following chart on the number of station, systems, offices and hosts in the first ten years of the selected medium shall only serve to give an impression of patterns of development in a sector in terms of its network nodes.^{20,21}

¹⁹ For an introduction to these trends from a policy perspective see e.g., McQuail, Dennis, and Karen Siune, eds. *Media Policy : Convergence, Concentration, and Commerce*. Euromedia Research Group. London/ Thousand Oaks/ New Delhi: Sage Publications, 1998.

²⁰ Moreover, this chart compares apples and oranges – functionally and economically, radio stations are quite different from cable systems, but more similar to each other than post offices. Internet hosts are entirely virtual, and a better measure would be the number of Internet Service Providers (ISP).

²¹ Sources:

Field, Alexander J. “Radio and television – stations, sets produced, and households with sets: 1921–2000.” Table Dg117-130 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press, 2006.

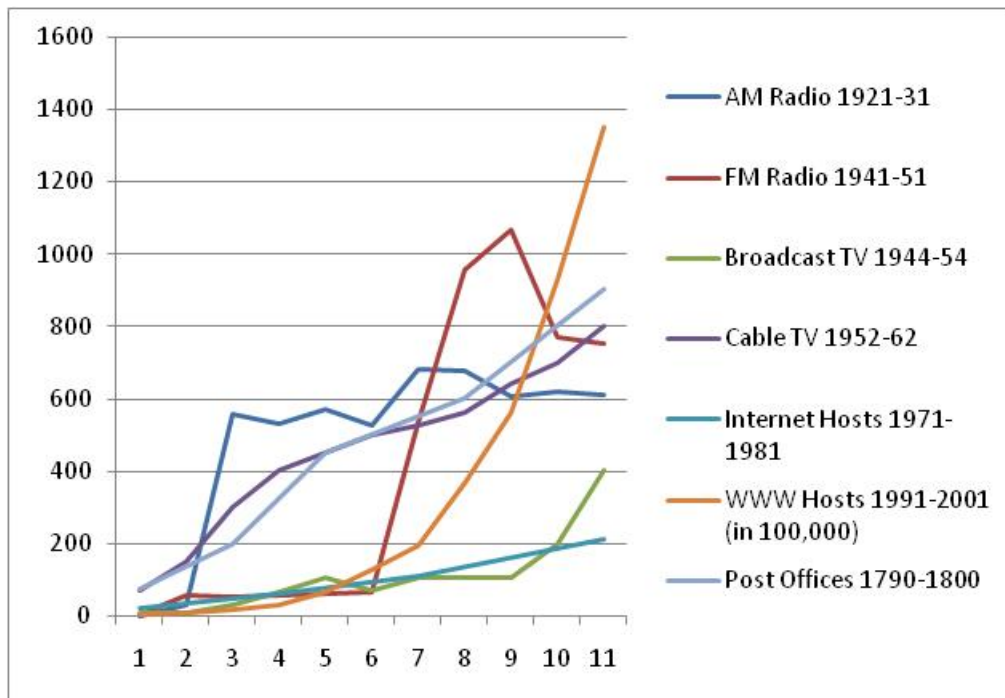


Fig. G3-8. Network nodes for selected media in first ten years of existence

6 Revenues and Expenditures

A major factor in discerning the relevance and contribution of a communications technology or sector is its economic viability. Revenues in this sector typically consist of some sort of end user fee or rate on the one hand, and of income from advertising.²² The willingness to pay for the use of a particular service influences both supply and demand. Since the middle of last century, the total amount of money paid for advertising has grown exponentially. In 1960, all media combined accounted for less than 10 billion dollars, while in 2007 it amounted to 280 billion. Until 2000, all media increased their share, albeit at different rates. The highest overall increase is due to the direct mail industry,

Unknown, "Internet hosts and Web sites, by type: 1969-2002." Table Dg110-116 in Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright.

USPS "Publication 100 - The United States Postal Service - An American History 1775 - 2006." Washington, May 2007.

²² For networked infrastructures, subsidies used to be a most important source for financing their operations. They will not be considered here. Both revenue streams, from users and advertisers, are influenced by larger economic trends, in particular recessions and booms

which now accounts for over 60 billion dollars – 20% more than the next closest medium, broadcast TV, takes in. After 2000, however, a key change can be observed, and attributed to the advent of the Internet. In three of the media – broadcast TV, radio, and newspapers, advertising revenue has stopped increasing. Newspapers have in fact lost nearly 10% of their advertising revenue, while the Internet now claims about 10 billion dollars. It remains to be seen how much of the advertising budgets will be spent on the Internet in the future, and if any of this is in addition to, or substituting to spending on traditional media. If the cost/revenue per contact ratio is any indication, the Internet should attract more advertisers than direct mail, with a ratio of 1 to 18 versus 1 to 2.²³

Table G3-1. Cost and revenue per contact for direct orders

	Cost per contact in US\$ (direct orders)	Revenue per contact in US\$ (direct orders)
Flat mail	0.46	0.85
Catalog	0.57	2.41
Email	0.01	0.18
Telephone	1.27	3.98

²³ Source: http://www.usps.com/directmail/_pdf/MediaChoicesTodayWhatsGettingThrough.pdf

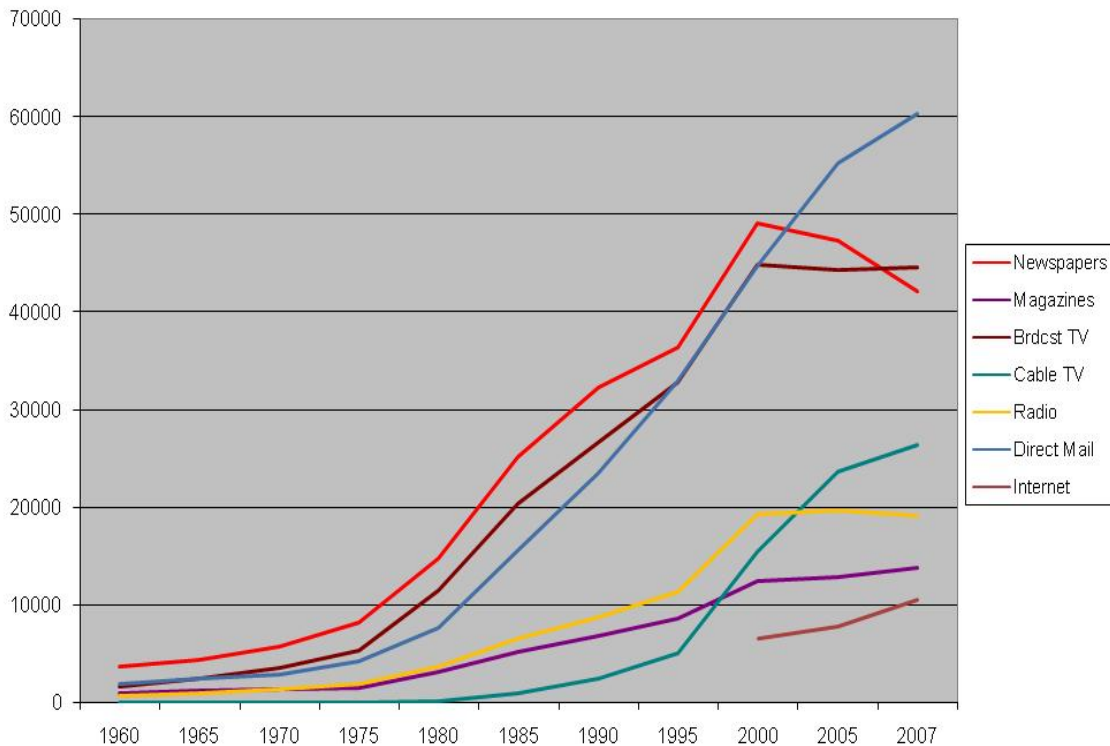


Fig. G3-9. Advertising expenditures by medium 1960-2007 (in million US\$)²⁴

The other side of the revenue coin is the cost of a particular service to the public. The following compilation of average monthly rates and costs shows that expenditures for postal services are the lowest, followed by local phone service, cable TV, and cell phones. People spend very little on postage – around \$5 with little variation over the past 15 years. This is strictly a pay-as-you-go fee – the service is available whether or not one uses it. In contrast, the other four services are only available if a monthly subscription fee is paid, which includes a certain amount of costs per use (phone calls in two cases, selected cable channels in the other.) Interestingly, the potential substitutes local phone and cell phone seem to increase at similar rates. One reason may be the abovementioned concentration of providers – traditional local (and long-distance) phone companies were al-

²⁴ Raff, Daniel M. G. , “ Advertising expenditures, by medium: 1867–1998 .” Table De482-515 in Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press, 2006.

lowed to enter the cell phone market, and vice versa. At the same time, the two newest technologies exhibit different rate developments. Cell phone bills are now much lower from when the service was first introduced in the late 1980s. Cable TV costs, however, have been increasing sharply over the years.

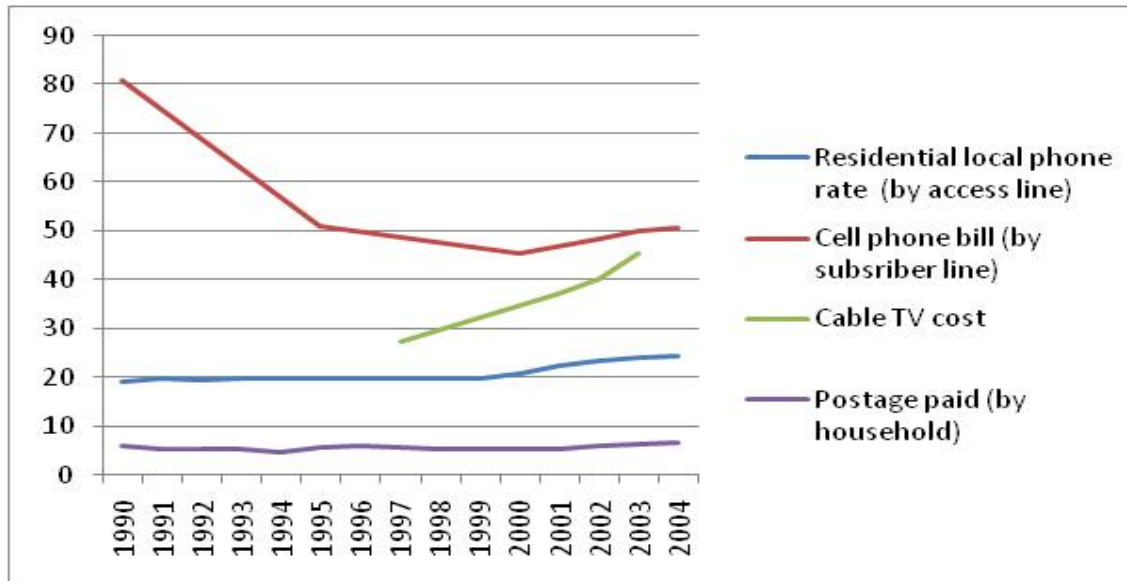


Fig. G3-10. Cost of media on average per month (in US\$) 1990-2004.²⁵

The issue of costs also raises the question whether the availability of a certain means of communication varies by income. The two tables below give answers for two different media, postal service and high-speed Internet service. The first table shows the correlation between mail-based communication and household income. The contrast here is even more stark. Households with a median income of \$27,000 receive less than 12 pieces of mail per week, while those with a median income of \$88,000 receive over 45 pieces.

The second table tracks the percentage of zip codes with different median household incomes (an indicator of wealth of a certain community) that have at least one high-speed subscriber (for services such as DSL and cable, which is necessary for an increasing number of Internet applications, as well as some radio and broadcasting services.) In

²⁵ Sources: Hong, Seung-Hyun and Frank A. Wolak. Relative Prices and Electronic Substitution: Changes in Household-level Demand for Postal Delivery Services from 1986 to 2004. Available at <http://faculty.haas.berkeley.edu/borenste/WolakPostal070501.pdf> April 30, 2007.

U.S. Census Bureau (2008) The Statistical Abstract 2008 Table 1119. Telephone Systems--Summary: 1984 to 2004. Available at http://www.census.gov/compendia/statab/cats/information_communications.html. Last accessed September 20, 2008

2001, when high-speed access was relatively new, and costly, there are significant differences depending on whether one lives in a rich or poor community. While 96% of zip codes with a median income of over \$53,000 had subscribers, only 59% of areas with median incomes of less than \$21,000 had such service. It is those areas, too, that seem to take the longest to catch up to the rest of the country, even as the technology itself is now accessible almost everywhere. Clearly, availability itself does not necessarily result in use. It is remarkable, however, that the initial gaps in all other zip codes have been virtually closed by now.

Table G3-2. High speed access lines subscribership by household income (in percent) 2001-2007²⁶

Median Household Income	2001	2002	2003	2004	2005	2006	2007
\$53,494 to \$291,938	96	98	99	99	99	99	99
\$43,617 to \$53,478	91	94	96	97	98	99	99
\$38,396 to \$43,614	84	89	94	96	98	99	99
\$34,744 to \$38,395	80	85	92	94	97	99	99
\$32,122 to \$34,743	77	83	90	93	97	98	99
\$29,893 to \$32,121	73	80	90	93	97	98	99
\$27,542 to \$29,892	74	80	89	93	97	98	99
\$24,855 to \$27,541	70	77	87	91	96	98	99
\$21,645 to \$24,855	67	77	87	91	96	98	99
\$0 to \$21,644	59	69	78	81	88	91	92

Table G3-3. Characteristics of Higher- and Lower-Mail-Volume Households 2007²⁷

Median Annual HH Income	Mail received per HH per week
\$88,058	45 or more
\$73,736	36-44
\$66,695	30-35
\$56,522	24-29
\$48,145	18-23
\$36,424	12-17
\$26,465	Less than 12

Besides income and other demographic factors, clearly is also a geographic dimension to the availability of communication technologies and services.

²⁶ Source: FCC (2008). High-Speed Services for Internet Access: Status as of June 30, 2007. Industry Analysis and Technology Division Wireline Competition Bureau. March 2008

²⁷ Source: USPS (2007) The Household Diary Study. Mail Use and Attitudes 2007. Washington, DC: USPS; p.14.

7 Population and Geographic Distribution

The U.S., like other industrialized societies, has seen a steady shift in population and migration patterns. The most pronounced is the increasing urbanization and concentration of the population in metropolitan areas.²⁸

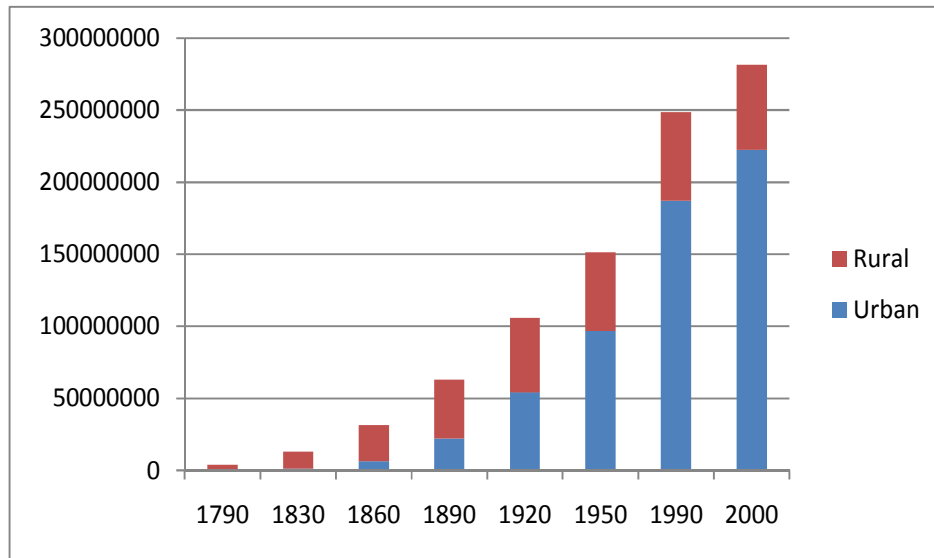


Fig. G3-11. Urban and rural population 1790 to 2000

This increase is due to two main components: natural change and immigration. Between 2000 and 2005, the U.S. has experienced an overall population increase of 5.3%, with 3.1% in natural change and 2.3% in immigration.²⁹ These rates, just slightly higher, are mirrored in metropolitan areas. Non-metropolitan areas, however, saw only a 1.1% increase through natural change, and only 0.7% increase through immigration.

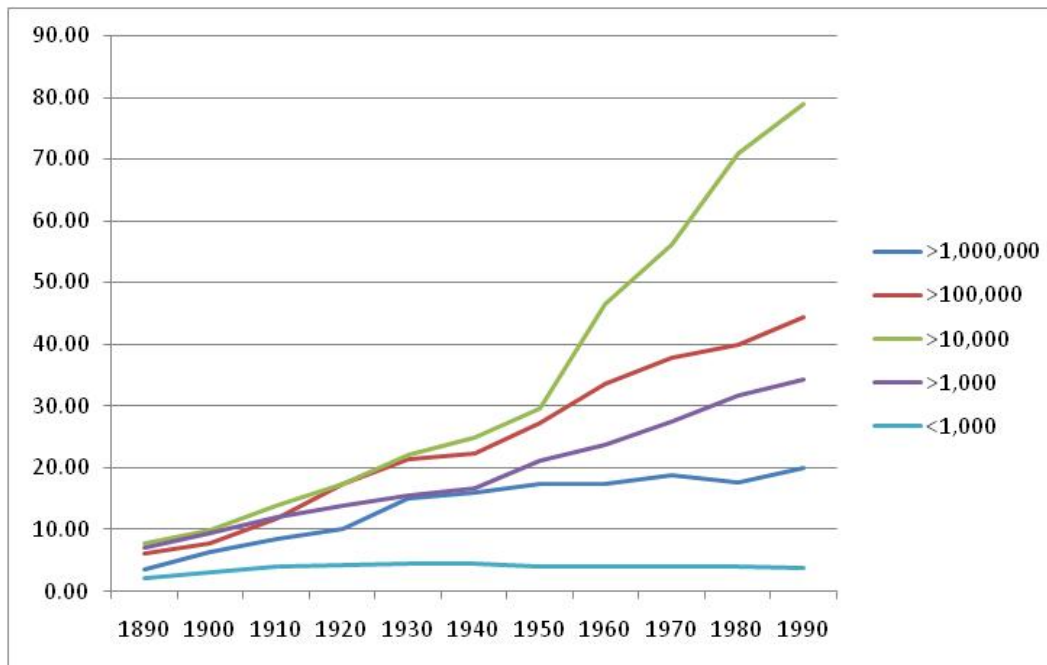
²⁸ The definitions of urban, rural, metropolitan and non-metropolitan areas vary depending on source and purpose. The Office of Management and Budget (OMB) defines metropolitan areas as central counties with one or more urbanized areas with 50,000 people or more, and outlying counties that are economically tied to the core counties, as measured by the share of employed population that commutes to core counties to work. Non-metropolitan counties are outside the boundaries of metro areas. By this definition, then, rural includes places and people living outside the primary daily commuting zone of cities of 50,000 people or more. The U.S. Census Bureau defines rural areas as comprising open country and settlements with fewer than 2,500 residents. Most counties, whether metropolitan or nonmetropolitan, contain a combination of urban and rural populations.

²⁹ The third component of change, net domestic migration, is less than 1% overall, and in both metro and non-metro areas.

Table G3-4. Population Change Components 2000-2005

	Total	Natural Change	Immigration	Net Domestic
U.S.	5.3	3.1	2.3	0
Metro	6	3.5	2.6	-0.1
Non-metro	2.2	1.1	0.7	0.5

When looking more closely at the sizes of places where people live, the highest growth can be observed in medium-sized towns and cities, usually referred to as suburbs. Especially since the end of World War II and the subsequent economic and population growth, places with 10,000 to 100,000 inhabitants have attracted the lion share of people. All other size categories have grown in population, too – with the notable exception of the ones under 1,000 inhabitants. Their total population has remained almost constant for the last 100 years since 1910.

**Fig. G3-12.** Population by size of place 1890-1990

With the number of people living in cities increasing, the question arises of how this impacts service provision to those still living outside the most densely populated areas. One indicator, used already elsewhere in this section, is the access to high-speed access lines that enable end users to connect to the Internet, measured as the percentage of zip

codes with at least one high-speed subscriber. In 2001, very sparsely populated areas (15 or fewer persons per square mile) had a relatively low rate of subscribership with below 50%, compared to the more than 95% for areas with upwards of 268 people per square mile. By 2007, however, access to high-speed Internet was universally given throughout the country, except for about 10% of zip codes with populations under 6 people per square mile. For comparison: the District of Columbia has a density of 9,400 people per square mile, and nearby Loudon County, VA has a density of 326.

Table G3-5. High-speed access lines subscribership by population density 2001-2007³⁰

Persons per Square Mile	2001	2002	2003	2004	2005	2006	2007
> 3,147	98	99	99	99	99	99	100
947-3,147	97	98	98	99	99	100	100
268-947	96	98	98	99	99	99	100
118-268	92	95	97	98	99	99	99
67-118	88	93	96	98	99	99	99
41-67	81	88	94	96	98	99	99
25-41	73	81	90	94	98	98	99
15-25	59	70	83	89	96	97	98
6-15	51	61	77	84	94	97	98
< 6	37	50	69	73	84	89	91

For individuals, the ability to obtain a certain service obviously depends on providers delivering it in the first place. The following maps by the Federal Communications Commission illustrate the distribution of competing local and high-speed access carriers across the country. The first chart shows the availability of traditional wired access lines provided by competitive local exchange carriers (CLEC).³¹ Sections in green have zero delivery, while sections in blue have more than seven providers to choose from. Not surprisingly, the zero delivery areas are in the most remote parts of the country, while the heaviest concentrations are along the population centers.

³⁰ Source: FCC (2008). High-Speed Services for Internet Access: Status as of June 30, 2007. Industry Analysis and Technology Division Wireline Competition Bureau. March 2008

³¹ Source: FCC (2008) Local Telephone Competition: Status as of December 31, 2007. Washington, DC: Industry Analysis and Technology Division Wireline Competition Bureau. September 2008.

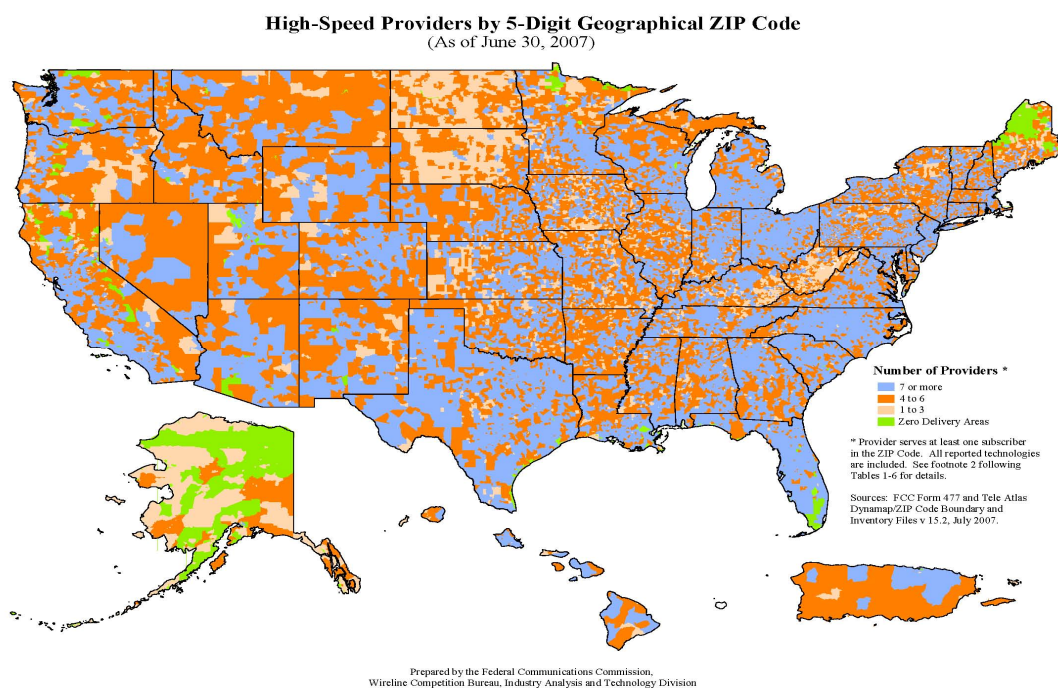
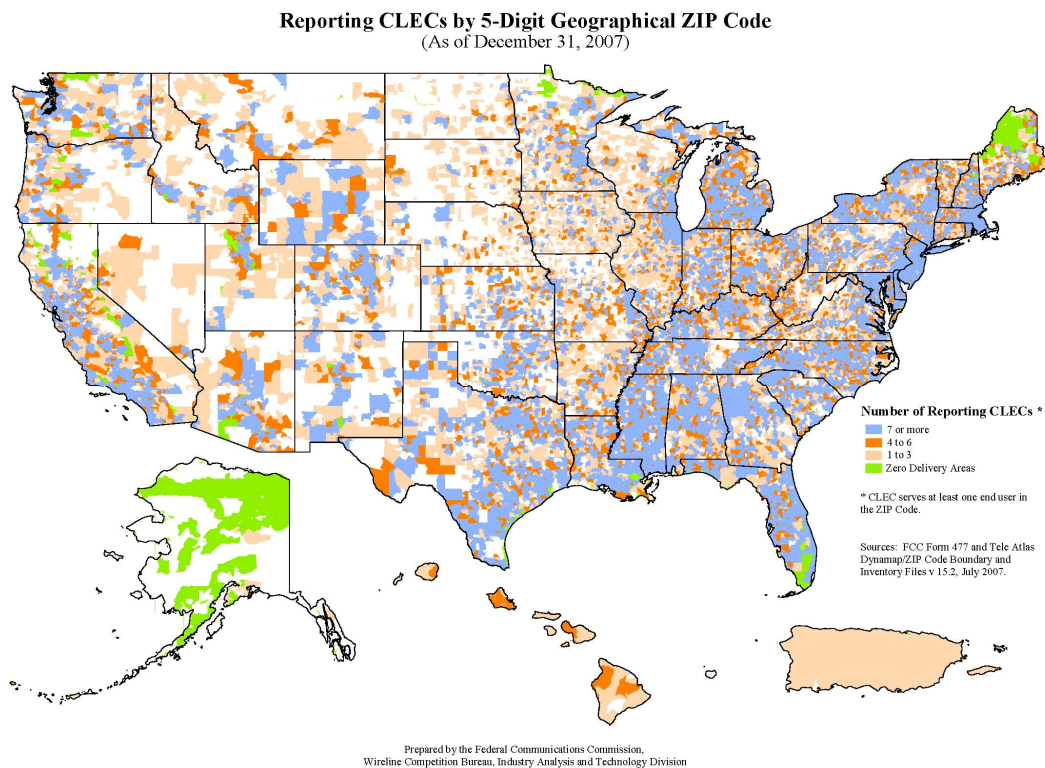


Fig. G3-13. Map of local and high speed access line provider options 2007

It should be noted that these CLEC hold a total of 29 million access lines, while incumbent local exchange carriers (LEC) hold an additional 130 million. Thus, low CLEC areas does not mean a gap in phone service.

In comparison, the second map illustrates the availability of high-speed services³² The distribution here follows the pattern of traditional phone lines, for obvious reasons: One, the relative ease of utilizing existing physical networks; two, the overlap between providers of traditional and new services.

The lesson here is that new technologies are not first and foremost reaching previously underserved populations as much as they are increasing options for all others.

8 Outlook

The need for universal postal service is influenced by the availability and use of alternative information and communication technologies (ICT) for collecting, processing, and delivering items of correspondence, transaction, advertising, periodicals, and parcels.³³ Such availability and use is, in turn, related to trends in society, economy, and technology at large.

Trend 1: The amount of information and communication is increasing

Information and communication technologies have enabled a steep increase in the creation and dissemination of information across the board, meaning that almost all means of communication are used more, albeit it with changing distributions of that volume within and across different media. This holds true in relation to mail as well: households with greater access to electronic communication also receive high volumes of mail and other forms of communication.³⁴

Trend 2: New ICT are not adopted evenly, and do not rapidly replace others

Most technological innovations have a slow start, diffuse more rapidly as adoption increases, then level off until a small percentage of potential adopters remain. At the same

³² Source: FCC (2008). High-Speed Services for Internet Access: Status as of June 30, 2007. Industry Analysis and Technology Division Wireline Competition Bureau. March 2008

³³ These categories are used by the USPS to distinguish the different market segments of mail. The first three fulfill a communication function for personal correspondence, business transactions, and advertising, the postal service has a distribution function, namely the dissemination of print publications (periodicals), and shipping of goods (packages). Except for the latter, there are technological alternatives for these functions.

³⁴ See USPS (2007) The Household Diary Study. Mail Use and Attitudes 2007. Washington, DC: USPS; p.14.

time, people develop preference of technology use early on, and those patterns are likely to remain relatively stable as generations move through the different stages of aging. The fact that email use has become a daily activity in every age group, and that text messaging is now added as a complementary use by under 25 year-olds indicates that personal correspondence, and more and more transactions, will be shifting online.

Trend 4: The availability of alternatives eventually entails substitution effects

This holds true for both substituting e same holds true for users, the high-volume mail households are increasingly using their electronic alternatives: Between 2005 and 2007, households that received 30 or more pieces of mail each week increased the share of bills paid via Internet from 15 percent to 21 percent. Even for households that received less than 30 pieces of mail each week, the share rose from 10 percent to 16 percent.

Trend 3: Nationwide availability of technology still leaves initial gaps in service

Evidence from telecommunications shows that there are certain, and usually the same geographic areas of the country that are underserved. While these areas are sparsely populated, and thus result in a small percentage of people affected, there is a greater number of people that have lower than average ICT use because of their socio-economic status.

9 Bibliography

- “Consumer Choice Survey.” Princeton Survey Research Associates International for the Pew Internet & American Life Project.: Available at <http://www.pewinternet.org/> Last accessed August 15, 2008.
- “Internet hosts and Web sites, by type: 1969–2002 .” Table Dg110-116 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press, 2006.
- Cowan, Ruth Schwartz. *A Social History of American Technology*. New York: Oxford University Press USA, 1996.
- Federal Communications Commission. “High-Speed Services for Internet Access: Status as of June 30, 2007.” Industry Analysis and Technology Division Wireline Competition Bureau. March 2008
- . “Local Telephone Competition: Status as of December 31, 2007.” Washington, DC: Industry Analysis and Technology Division Wireline Competition Bureau, September 2008.
- Field, Alexander J. “Radio and television – stations, sets produced, and households with sets: 1921–2000.” Table Dg117-130 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press, 2006.
- . “Telephone industry – telephones, access lines, wire, employees, and plant: 1876–2000.” Table Dg34-45 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press, 2006.
- Flichy, Patrice. *Dynamics of Modern Communication: The Shaping and Impact of New Communication Technologies*. London; Thousand Oaks: Sage Publications, 1995.
- Hong, Seung-Hyun and Frank A. Wolak. “Relative Prices and Electronic Substitution: Changes in Household-level Demand for Postal Delivery Services from 1986 to 2004.” Manuscript. Available at <http://faculty.haas.berkeley.edu/borenste/WolakPostal070501.pdf> April 30, 2007.
- McQuail, Dennis, and Karen Siune, eds. *Media Policy : Convergence, Concentration, and Commerce*. Edited by Euromedia Research Group. London/ Thousand Oaks/ New Delhi: Sage Publications, 1998.
- Pew Internet & American Life Project Survey, September 2007. Available at <http://www.pewinternet.org/> Last accessed August 15, 2008.
- Raff, Daniel M. G. “Advertising expenditures, by medium: 1867–1998 .” Table De482-515 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines,

- Alan L. Olmstead, Richard Sutch, and Gavin Wright. New York: Cambridge University Press, 2006.
- Rogers, E. M. *Communication Technology: The New Media in Society*. New York: Free Press, 1986.
- . *Diffusion of Innovations*. 5th ed. New York: Free Press, 2003.
- Spar, Debora L. *Ruling the Waves. Cycles of Discovery, Chaos, and Wealth from Buccaneers to Bill Gates*. New Haven: Harcourt, 2001.
- U.S. Census Bureau. The Statistical Abstract 2008. Washington, DC, 2008.
- USPS. "Publication 100 - The United States Postal Service - An American History 1775 – 2006." Washington, May 2007.
- . *The Household Diary Study. Mail Use and Attitudes 2007*. Washington, DC: USPS, 2007.
- Wells, Tracy. "A Portrait of Early Internet Adopters: Why People First Went Online - and Why They Stayed." Washington, DC: Pew Internet & American Life Project, 2008.

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