

Cities, Telecommunications
Competition, and Economic
Development

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ABSTRACT

Changes in the telecommunications industry have made it vital for cities to maximize the potential of the technology in attracting, retaining, and developing economic activity. While the technology appears to facilitate decentralization of many corporate activities, a diverse and state-of-the-art infrastructure is also essential for centralized financial services, corporate headquarters, and related business services, which are highly dependent upon telecommunications. Cities do not need to spend money to build this infrastructure but must develop sound public policy to encourage competitors. This article analyzes the link between telecommunications competition and urban economic development through quantitative assessments, case studies, and literature review, and it presents the options that cities hold.

CITIES, TELECOMMUNICATIONS COMPETITION, AND ECONOMIC DEVELOPMENT

A diverse and state-of-the-art telecommunications infrastructure is vital to the economic development of urban areas in the United States. As we enter the 1990s, cities must develop public policies that encourage the development of such networks and innovative services for their businesses and residents. Yet, many cities do not have any explicit policies and risk losing control over their telecommunications services, as they have with cable television. This paper suggests some policy options for cities to help develop a strong telecommunications infrastructure in an environment of change and uncertainty in the industry since the AT&T divestiture.

First, the paper introduces the major issues for cities. Second, it shows just how important the telecommunications infrastructure is to economic development, by utilizing a literature review, quantitative assessments, and case study examples. Next, it presents and analyzes the options that cities hold. Finally, the paper concludes with some more general points.

The Issues for Cities

With so much on their agendas, why should city officials care about telecommunications? It represents perhaps their most important infrastructure for economic development in the next century. Nations and states use telecommunications for economic development. Britain and Japan liberalized their telecommunications sector partly to enhance the status of their world financial centers, London and Tokyo. Singapore and Hong Kong are trying to bolster their world-wide position through deployment of a state-of-the-art telecommunications infrastructure. In the U.S., Nebraska deregulated telecommunications to achieve economic development goals. Some cities, such as New York and Minneapolis, have already incorporated telecommunications enhancements into their corporate attraction and retention strategy. Japan has even linked national and urban telecommunications and economic development policy through its "technopolis" strategy.¹

Despite the important link between economic development and telecommunications, many city policy-makers do not know how best to promote it. "Telecommunications planning on the local level is a new idea and one only poorly operationalized in most locales."² With cable televisions as the most recent example of

municipal involvement in telecommunications, there is ample room for improvement.

Other infrastructure, such as water tunnels, bridges, and transit, need to be rebuilt in older cities or built anew in growing areas, usually with public money. Fortunately, public money is not required in telecommunications, only sound public policy. Some important choices must be made about promoting competition, providing rights-of-way, and choosing suppliers. Many scholars believe that cities are at least the initial beneficiaries of the increased saliency of telecommunications to business firms.³ How long that lasts may depend upon their own policies.

No goal of urban telecommunications policy is more important than developing a strong infrastructure for economic development. In the transition to a service-based economy in the U.S., in which over half of all employment is already in information-intensive industries, the most important infrastructure is different from, although analogous to, the transportation nodes needed by manufacturing operations. "To use a common analogy, the communications industry can be viewed as the transportation of highways, roads, and bridges upon which information traffic travels; the computer industry can be viewed as providing the

traffic regulation functions which facilitates the use by and processing of information vehicles; and the information and knowledge industries can be viewed as the traffic messages that flow over the communications networks and are processed in main-frame, mini, and personal computers."⁴

This infrastructure has several levels. "There are three main components to the new telecommunications infrastructure in the U.S.: (1) long-distance or intercity systems; (2) regional or local distribution systems; and (3) intrabuilding or intracomplex communications systems, such as local area networks or "smart building" systems".⁵ The first segment is mostly a function of national and state policy, while the second and third are affected significantly by local policies.

Four sets of changes have forced cities to play a role in telecommunications policy. First and foremost are changing technologies. Starting in the 1960s, microwave technology, and now optical fiber, allow private firms with large telecommunications demands to create their own networks; for example, Citicorp created Micronet. This can alter their traditional relationships with common carriers. "A buyer today may become a seller tomorrow and a rival the day after".⁶ Switches capable of digital trans-

mission and increased optical fiber deployment allow integrated broadband networks, the several interconnection points of which form a variety of interconnection opportunities. This means that computers and telecommunications can become linked completely, exemplified by distributed data processing, software embedded within the telecommunications network, and local area networks.

Second are international changes. Trade in services, especially financial, is accelerating, making major cities nodes in the *global* information market. Consequently, the volume of international telecommunications itself is exploding, particularly between major cities.

Third, national policy choices have led to the AT&T breakup, cable television deregulation, and more competition in telecommunications equipment and service. At the state level in the U.S., markets are being opened to competition as well, with nearly one-half of states now allowing competition within "local access and transport areas (LATAs)".⁷

Fourth, long-run economic trends are increasing the dependence of businesses upon telecommunications. Jonsher notes that "the output of the information sector is used primarily by industry rather than by consumers."⁸ In 1983, U.S. revenues from the communications, computer, information, and knowledge industries

already totaled three times those from the steel industry, twice those of the automobile industry, and nearly as much as the oil industry.⁹ And in cities, firms in these industries employ a much larger share of workers than in the U.S. as a whole.

What can and should cities do as powerful technological forces and higher level regulatory choices are shaping the telecommunications network of the 21st Century? Cities can make some important choices to take an active role in shaping networks rather than simply floating aimlessly in this sea of change. They must not simply be reactive but must perceive themselves more as co-developers of their telecommunications infrastructure to enhance economic development.¹⁰ "Cities, however, have been slow to recognize the importance of telecommunications facilities and opportunities. . . . As information technologies and systems are intensively developed in the urban area and then networked to other (urban) areas, devoid of oversight by federal or state government and any public interest standard, it is left to the local area to monitor and, as much as it can, direct telecommunications development in ways that are socially desirable."¹¹

As a result of these trends, alternative local common carriers are emerging in metropolitan areas to provide competition

with the established local exchange carriers, such as the Bell telephone operating companies. Most communications by businesses are made to nearby locations; over two-thirds of all telecommunications traffic in 1981 traveled less than 1 mile.¹² For example, although Manhattan is by far the largest U.S. source of international telecommunications, 75% of calls originating in Manhattan also terminate there. The quality and diversity of the local telecommunications infrastructure is important and has been overlooked.

Most experts believe that some form of integrated broadband network, over which voice, data, video, and other information can all be carried, will be developed in the next two decades. A fierce political and economic battle between local exchange telephone companies and cable television companies is expected over control of the local access portion of such a network. Since there are problems with either of these industries dominating an integrated network, including monopolization, concerns about the separation of communications carriage and content, and the use of captive ratepayer subsidies to pay for it, a *third* way, involving private risks by alternative local common carriers can help achieve diverse, competitive broadband metropolitan networks while these other battles continue to rage at higher

levels of government.

The Economic Development Link

City policy-makers should examine in more detail the link that has been asserted between telecommunications and economic development. They will find that the presence of telecommunication facilities adds to the vital infrastructure for businesses in the coming decades. "New communications technologies enhance the productivity of the city's industries by allowing firms to extend their geographic reach and to market new products and services on a global basis. This is essential to the growing international trade that is centered in the world's "gateway" cities."¹³

Several studies have measured the intensity of demand for telecommunications services by different service and industrial sectors. International Communications Association figures from 1984 show that telecommunications expenses as a percentage of sales are 6.02% in the computer service industry, 2.34% for non-bank financial firms, 1.86% for airlines, and 1.09% for banks.¹⁴ Coopers and Lybrand studied one-digit Standard Industrial Classification (SIC) codes and determined that the largest

users of telecommunications services are finance, insurance and real estate (with brokerage, banking, and insurance the highest specific sectors), followed by transportation and public utilities, business services, and wholesale trade. The SIC categories using telecommunications far less than the average, include manufacturing, construction, retail trade, medical services, public education, and government.¹⁵ Thus, evidence confirms that the highest categories of usage are the leaders of the information economy in cities - finance, real estate, insurance, and business services. Table 1 shows the share and growth rate of major sectors of the US economy and the importance of telecommunications for that sector. The sectors that are more dependent upon telecommunications grew faster from 1975 to 1985 than the less dependent sectors (construction is the only exception).

(TABLE 1 ABOUT HERE)

The four most telecommunications-intensive sectors already represent nearly half of U.S. employment and will only become more important. In cities, these sectors play an even greater role in the economy; these four sectors total about 61% of jobs in San Francisco, for example, because downtown central business districts have become centers of information exchange and service

consumption.¹⁶

Large firms are the biggest users of telecommunications. One measure of these firms are headquarters of Fortune 500 industrial firms. However, as Coopers and Lybrand showed, many of these industrial firms may not be the largest users. Fortune magazine has reflected the shift in the U.S. economy to information and knowledge industries by also publishing a Fortune 500 for service corporations; the headquarters of these large corporations rely upon excellent and reliable telecommunications links. These headquarters are more often in cities and are vital to urban economies because so many secondary jobs, including business services such as advertising, banking, and printing, are dependent upon them, as well as tertiary jobs, such as those in restaurants, delivery services, and maintenance services. By meeting the telecommunications needs of large corporate users, cities can help retain these secondary, "spin-off" jobs as well. Urban planners use the concept of "multipliers" to estimate secondary impacts from new or retained businesses, and they are estimated to be between 2.0 and 2.5 for these industries in large cities.¹⁷

Furthermore, by better serving the telecommunications needs

of existing large corporate users, cities may also attract new large users. "According to William Shapiro, Senior VP of The Fantus Company, a Chicago-based site selection company, telecommunications is "absolutely critical in any facilities decision" . . . the more telecommunications intensive a business is, the more telecommunications plays a role in site selection".¹⁸ "A necessary correlate is that local telecommunications infrastructures will become very important considerations to businesses when they evaluate their locations".¹⁹ Travers Waltrip, vice-president for telecommunications of The Travelers Companies, says to economic development officials, "Realize that you must have a very good, state-of-the-art telecommunications infrastructure and that it must be priced at cost, not at subsidy levels. To me that's the challenge people should talk about when addressing economic development."²⁰

For example, Memphis has become the "telecommunications capital of the south", according to David Birch, because more 800 and WATS calls flow through it than any other regional city. The reason is that the presence of Federal Express and Holiday Inns forced the local telephone company to modernize their equipment, which has since lead to the attraction of a regional Merrill Lynch facility and a Williams-Sonoma catalog office. "The

urban area offers multiple points of access to alternative communications systems; because many types of information processing activities can achieve economies of scale when they provide the same service to various clients, most of whom are also located in urban areas, such operations will locate in or near a city."²¹

Corporate headquarters personnel, finance, insurance, and real estate, legal and other high-level business services need face-to face contact in addition to excellent communications links to the rest of the world. As a result of this, "a few American cities . . . are exceptions to the post-World War II trend in the United States in which economic activity flows out of, not into, central cities."²² Furthermore, "The technologies are likely to be found first in the largest markets. Advantages in communications already possessed by larger metropolises will be reinforced before the advantages diffuse to smaller place"²³

Nevertheless, in the long-run, inexpensive long-distance telecommunications (to the point of price insensitivity to distance) is likely to have a decentralizing effect on the location of some businesses. Many service businesses will be nearly free of past constraints on location based on transportation and communications costs. The mail order industry is an excellent

example of this freedom. In this case, the whole industry was created by telecommunications, although not with that explicit intention; according to Gerald Faulhaber of the University of Pennsylvania's Wharton School, a Bell System engineer in the 1960s developed something first called Inward WATS (later 800 numbers), without which mail order would not have become a multi-billion dollar industry.²⁴

In the extreme, then, facilities such as corporate back-offices can locate anywhere. Back-offices are relatively routine records-keeping, data-processing, graphics, and accounting operations (that are peripheral to both headquarters operations and high-level, face-to-face business services), which, because of telecommunications, no longer need to be near their headquarters and can save on central city office rental costs by moving elsewhere. Most cities have already lost some back-office jobs to suburban locations. In the future more may move to other countries, with lower labor costs.²⁵

The movement of manufacturing jobs that went from: 1) central city in the U.S. to 2) U.S. suburbs, particularly after WWII to 3) third-world nations in the 1970s and 1980s, may be repeating itself, and more quickly, for back-office jobs. However, "despite the fact that technology makes it possible to locate

office activities at remote sites, near beaches, mountaintops, and in desert resorts, New York City continues to sustain and retain business".²⁶ So can other cities.

In New York City, after the exodus of manufacturing Fortune 500 headquarters in the 1970s, city officials realized that they needed to focus on the retention of back-office jobs. They wanted to keep these jobs within city boundaries, especially because they match the skills of many city residents. New York developed a targeted plan to offer subsidized space and excellent telecommunications facilities in outer parts of New York, especially Brooklyn and Queens, with office rents below Manhattan levels. The presence of a diverse telecommunications infrastructure, including alternative local common carrier facilities, played a role in the success of this plan.

As important as the retention of large corporations and their back-offices are to urban economies, it must be recognized that they have not been creating most of the new jobs in this decade. From 1980 through 1986, U.S. Fortune 500 industrial corporations eliminated over 3 million jobs from their payrolls, while smaller firms created 17 million jobs. Birch cites the importance of telecommunications infrastructure (in his 1987 book

Job Creation in America), particularly for the innovative, small businesses that actually create most jobs. To attract such innovative new firms, Birch cites the need for (in order) higher education, labor force, quality of government, *telecommunications infrastructure*, and quality of life, and claims that each of these is more important than land, transportation, and energy. Birch says, "Locales that offer state-of-the-art communications facilities have a great advantage in this kind of economy."²⁷

The most detailed breakdown of "telecommunications-intensive businesses" comes from University of Texas researchers, based on the categories developed by Porat (1977).²⁸ They use a detailed analysis down to the level of two, three and four-digit SIC codes.²⁹ Most of the employees in these industries add high value to the local economy; for example, these firms supply 35% of San Francisco's total private industry payroll. These calculations are shown for a few large cities and the national average in Table 2.

These cities greatly exceed national average figures in information services and in media employment. In the other two telecommunications-intensive categories (information technology and infrastructure and research and development), however, they generally have a smaller share of employment than the national

average.

(TABLE 2 ABOUT HERE)

While large cities will benefit most from a diverse, competitive local telecommunications infrastructure, many other areas will also benefit from enhanced telecommunications facilities. Robert Jackson, Director of External Affairs for MCI, says, "the presence or absence of a vital, modern telecommunications system in this region, or any other, is one of the prime considerations for anyone looking to make an investment."³⁰ A Maine Task Force on Telecommunications cited several local industries as dependent upon reliable, high-quality telecommunications, including direct marketing, engineering and consulting services, data base and software development, printing and publishing, banking, and hospitals.³¹ The Wall Street Journal recently reported on telemarketing operations that have relocated to small towns in the farm belt, such as Breda, Iowa, where productive labor is available and inexpensive.³²

In Nebraska, telecommunications regulatory policy has been driven largely by economic development concerns. Former governor Robert Kerrey said, "If you live in a rural, isolated state like

Nebraska, you absolutely need to be connected to the rest of the country. And there is technology coming along that can connect us much more closely. But to get it, we have to move away from arguing, 'What should the price of the product be?' and into 'What should the product be?'"³³ Kerrey claims that 12-15 telecommunications-intensive firms have located operations in Nebraska because of the positive climate towards enhanced telecommunications services.

Options for Cities

The most important point for cities is that their choices (either explicit or implicit) will have a major impact on how their telecommunications infrastructure develops. The previous analysis should convince city policy-makers to agree with numerous analysts, including Birch, Moss, and Strover, that an excellent telecommunications infrastructure is an important component of an urban economic development strategy. The question remains: How best to build such an infrastructure? Should a city bolster, protect, and work with a local monopoly firm so that it can provide up-dated facilities to corporate customers? Or, is it better to encourage competition among provider firms?

On the national level, we have already answered these

questions: the transition problems associated with the AT&T breakup were endured in order to achieve the benefits of competition. On the local level, the likely answer is also that competition will promote innovation in technology, diversity and new services, while a protected monopoly may become complacent about its customer base. "A major boost to alternative carriers has come from the realization by corporate America that businesses can do better by designing their own communications networks - or using carrier who will do it for them - at a fraction of the cost of continuing to use conventional means. Stories of unresponsive entrenched carriers have helped to fuel the fire".³⁴

The Northeast-Midwest Institute concurs: "Over time, a regulatory environment that permits competition will produce a more modern and efficient telecommunications infrastructure".³⁵ Evidence from other high-technology industries suggests that under uncertainty, competition may be more likely to advance *innovation* than monopolistic structures.³⁶

Cities need to develop a telecommunications policy that encourages innovation by promoting competition and diverse services. This is less a function of providing a new city regulatory structure and more a function of making sure that city policies do not interfere with or impede competition, but promote it. Yet,

"most local governments have been consumed with visions of two-way cable television in every household and have focused their attention on cable, thereby ignoring other technologies, such as fiber optics, mobile communications and microwave transmission, that will be more important in shaping communications patterns in cities."³⁷ Few of the books on cities and telecommunications have stressed anything but cable television and government telecommunications procurement.³⁸

In a time of uncertainty in technology and regulation, it seems best for local governments to have a flexible policy. "Advances in technology are so rapid that it is essential that government not be fixated on a single technology or a single type of communications facility. The public sector has an important stake in assuring that individuals and firms within a city have access to advanced telecommunications systems; however, unlike other critical components of the urban infrastructure, such as highways and water supply, the private sector has been the primary instrument for the construction of the telecommunications infrastructure in large American cities."³⁹ Cities should prepare an inventory of alternative facilities, regulatory and policy options, and service priorities.⁴⁰ "With an inventory of

local facilities in hand, the city might begin to assess where its goals in developing or utilizing local telecommunications can be best realized".⁴¹

Diversity of local facilities should be a goal for cities. The importance of diversity is best illustrated during crises. In 1984, Japan was stung by a major telecommunications cable fire in Tokyo that led to the loss of millions of dollars for large and small firms dependent upon telecommunications services.⁴² Consequently, recent Japanese policy has emphasized diversity: "If communication services are offered by multiple enterprises, this will eventually bring about a reinforced and better information infrastructure, including greater safety for cities in regard to information . . . The Osaka Media Port will lay optical fiber cables utilizing existing municipal subway and expressway networks, thus building a digital communications network that will offer services in addition to the system set up by the Nippon Telegraph and Telephone Company."⁴³

The U.S. has not been immune to telecommunications "black-outs". The 1987 Hinsdale, Illinois fire shut down telecommunications services completely. The 1988 computer virus problems point to the need for and value of diverse facilities in this related technology. Diversity should be an important criterion

in U.S. economic and national security policy because a diverse telecommunications infrastructure provides security for data transmissions, which are growing at nearly twice the rate of voice transmission. Enhanced data security is vital particularly for large financial firms.⁴⁴ Conference Board surveys of large firms have discovered that new services and reliability are the most important reasons for choosing an alternative telecommunications provider.

The presence of such diversity and competition can lead to an increase in the total volume of telecommunications activity in a city, and thus economic development. Hotelling recognized this phenomenon fifty years ago when he noted the propensity for similar services to locate near each other. For example, gasoline stations tend to locate next to one another at major highway intersections rather than spreading out more across geographic space. Since more than one station is located there, drivers see that agglomeration as the place to buy gasoline and this perception of customers increases the total volume of business for all providers. Similarly, fast-food stores locate near one another on highways and in shopping malls. Another analogy is the concentration of computer and computer-related firms in Silicon

Valley. An expansion of economic development in information services will be enhanced by allowing more than one local telecommunications provider to serve urban customers.

Furthermore, most scholars agree that competition is likely to stimulate innovation by incumbent firms, which leads to greater productivity for all firms and a bigger potential market. Some believe that this is even true in electric power distribution, a key infrastructure. Primeaux found that competition, not regulated monopoly, led to lower prices. "Actually, costs were found to be lower in situations where competition existed because the beneficial effects of x-efficiency outweigh any losses in benefits from scale-economies."⁴⁵ Just as economic development is not generally zero-sum, local telecommunications competition should be positive-sum.

Growth in decentralized data processing and computing technology accelerated rapidly when Apple began to provide competition for IBM, which has itself thrived even with increased competition, because of the expansion of the market. In telecommunications, such competition provides the best of both worlds; it is not likely to threaten the huge revenue base of the local exchange company, but it will force efficiency and innovation at the margins where competition is most viable. "Competition has

played a major role in the explosion of rewiring in both the cities and the countryside".⁴⁶ Since the market is growing rapidly at these margins, there are opportunities for more than one provider. "Given the current bottleneck on local loop transmission, cities should encourage competition lest one provider obtain too much control with no regulatory oversight."⁴⁷

In order to realize these gains, cities must recognize that the current franchising process in many cities is outdated and inefficient. The franchising process failed badly for cable television in many cities. Dennis Rapp, who supervised a study of telecommunications policy in New York State, advises jurisdictions to: "remove barriers to competitive entry. This entails relaxing local government franchising power over telecommunications firms . . ." ⁴⁸ Cities should encourage the use of their rights-of-way at reasonable rates. Instead, competitive providers in some cities, like Chicago, have faced major obstacles and barriers to entry.⁴⁹

Even coordination provided by an entrenched competitor of alternative firms, such as the Empire City Subway Company in New York City, a subsidiary of New York Telephone since 1891, which has provided duct space for 12,000 duct miles to Holmes Protec-

tive Company, Western Union, TV and CATV companies, and others, works better than a slow, overly politicized process of franchising.⁵⁰ For example, "a grant of right-of-way use to a phone company might carry with it a restriction on the type of cable to be used, or some reservation to grant use the same rights of way to competing service vendors. . . The city would be able to encourage optimal use of the limited space in conduit or in public rights of way by maintaining adequate inventories of the location and capabilities of both".⁵¹ The coordinating power and responsibility given to the Los Angeles City Telecommunications Department may provide a model for other cities.⁵²

The attractiveness of enhancing the telecommunications infrastructure through the promotion of competition is that, while there is need for public policy, there is no need for public money. Network linkages can then develop, with the public sector facilitating the kind of decentralized private market choices that promote innovation, particularly in times of rapid technological change and uncertainty in a competitive intercity economic development market.

Conclusions

Cities should encourage competition in the development of

their telecommunications infrastructure. Alternative local common carriers will enhance the economic development potential of major cities and metropolitan areas. In some cases, they are already doing so: "Teleport's fiber cable provides an important telecommunications infrastructure, at low cost, to major users in the city of New York and surrounding region."⁵³

Alternative local common carriers can provide back-up services that many firms will find increasingly vital to the conduct of their business and they can provide much needed competition in an expanding market. As a result, cities need not worry about "picking a winner" between only local telephone companies and cable television firms. While cities probably do not need to go as far as the "technopolis concept", they can take active policy steps. For example: "Cities can give preferred status to certain projects (e.g., teleports) in zoning or in financial assessments."⁵⁴

Cities need a policy to allow this market phenomenon to occur. For example, "Continued growth and innovation will depend upon regulatory policies that contribute to New York City's role as a world center for information-based services. Conversely, economically inefficient policies could constrain market competi-

tion and technological innovation and limit the continued development of the city's telecommunications infrastructure".⁵⁵

In addition to aiding in the retention of existing firms and jobs, especially financial and business service jobs, there is ample evidence that an advanced telecommunications infrastructure can help attract the innovative new, small businesses identified by Birch. "Information activities now constitute too important and prominent an economic component of major urban centers to be overlooked."⁵⁶ An enhanced telecommunications infrastructure is a positive symbol for marketing economic development and it shows that a city has reached a certain critical mass of business activity; this sends a signal that major players need to be there, and that small firms, particularly those providing the rapidly growing business services, should look there to serve larger customers. Thus, easing market entry is also a symbol of a city government caring about the large service firms and new small businesses that increasingly make up the lifeblood of their economy. Big Eight accounting firms call this creating a positive "business climate" and Birch calls it "quality of government".

NOTES

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- 15 Coopers and Lybrand. State Policy and the Telecommunications Economy in New York, 1987.
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- 18 Northeast-Midwest Institute Report. 1988. "Telecommunications Infrastructure and Economic Development in the Northeast-Midwest Region," prepared by Louise Arnheim, Shooshan and Jackson, p. 8.
- 19 Strover, p. 119.
- 20 Travers Waltrip, quoted in the transcript of "Telecommunications and Economic Development: A Regional View," April 7-8, 1987, Coalition of Northeastern Governors, Policy Research Center, p. 60.
- 21 Strover, p. 120.
- 22 Mitchell Moss. "Comments of the Urban Research Center at New York University supporting NYNEX's Request for a Waiver to Provide International Telecommunications", to U.S. District Court for the District of Columbia, 1988.

- 23 Booker-Gross, 1980.
- 24 Comments made by Gerald Faulhaber at Columbia University's Center for Telecommunications and Information Studies Conference - "Divestiture Five Years Later", March 2, 1989.
- 25 See the 10/18/88 New York Times article on insurance claims processing in Ireland for U.S.-based firms, Page D1.
- 26 Moss, 1988.
- 27 David Birch. Job Creation in America, 1987. The Free Press, p. 146.
- 28 Marc Porat. The Information Economy: Definition and Measurement, 1977. Special Publication 77-12, Office of Telecommunications, U.S. Department of Commerce; and Jurgen Schmandt, Frederick Williams, and Robert Wilson. Telecommunications Policy and Economic Development: The New State Role, forthcoming, Praeger Press.
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- 47 Strover, 1988, p. 138.
- 48 Dennis Rapp, quoted in "Telecommunications and Economic Development: A Regional View," 1987, p. 19.
- 49 Chicago Tribune article, page c-1, May 8, 1989.
- 50 See Pamela Jones, Under the City Streets: A History of Subterranean New York, 1978, Holt, Rinehart, and Winston.
- 51 Strover, 1988, p. 137.
- 52 According to the City of Los Angeles: "This Department is responsible for all cable television-related matters including enforcement, renegotiation of franchises, public programming and utilization. This Department also has authority and responsibility for overall coordination of City telecommunications plans and policies. . . The Department also has full authority for coordinating City telecommunications activities, developing and coordinating joint applications with the private sector and other governmental entities." Page 31 in "Los Angeles - Your Government at a Glance," 1985.
- 53 Moss, 1987, p. 143.
- 54 Strover, 1988, p. 139.
- 55 Moss, 1986, p. 394.
- 56 Strover, 1988, p. 132.

TABLE 1

U.S. ECONOMIC SECTORS
GROWTH AND TELECOMMUNICATIONS NEEDS

<u>Sector</u>	<u>1985 Employment Share</u>	<u>Growth 1975-85</u>	<u>Telecommunications Usage</u>
Finance, Insurance, Real Estate (FIRE)	6.5%	47.9%	2.37
Transportation, Public Utilities	7.0%	32.6%	1.75
Wholesale Trade	4.1%	28.4%	1.41
Services	31.1%	37.8%	1.05
(Business	3.7%	135.9%	1.51 for business services)
(Legal	0.9%	83.9%	

Manufacturing	19.5%	7.3%	0.82
Construction	6.5%	37.2%	0.61
Government	4.7%	3.5%	0.58
Retail Trade	16.8%	25.3%	0.35

TOTAL	96.2%	24.8%	1.00

Sources: Figures calculated by the author based upon 1988 Statistical Abstract of the U.S., Department of Commerce, Bureau of the Census; and Coopers and Lybrand.

TABLE 2

PERCENTAGE OF 1985 PRIVATE EMPLOYMENT
IN TELECOMMUNICATIONS-INTENSIVE CATEGORIES

	San Francisco	Chicago	Dallas	National Average
Information Services	22.7	14.2	15.1	9.9
Finance	9.7	4.7	3.5	2.9
Insurance	3.8	3.4	3.7	2.3
Real Estate	2.6	1.7	3.0	1.4
Computer/Data Proc.	0.8	1.1	1.6	0.6
Other Info. Services	5.8	3.3	3.3	2.3
Information Technology and Infrastructure	0.6	2.05	5.0	2.3
Research and Development	0.26	0.23	0.28	0.3
Media	5.4	4.6	4.0	3.7

TOTAL - Telecommunications Intensive Businesses	29.0	21.1	24.4	16.2

Sources: National figures are from Schmandt, et. al., forthcoming; city figures are calculated by the author from U.S. County Business Patterns; and all are as defined by the University of Texas study (see note 29).