THE TELECOMMUNICATIONS INDUSTRY IN UTAH AND ITS IMPLICATIONS FOR GENERAL SALES TAXATION

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FRP Report No. 97.1
February 1997
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I. OVERVIEW

It is not unusual to hear or read of an analyst refer to an industry as one going through a tremendous amount of upheaval, transformation or restructuring. The telecommunications industry is certainly no exception. In fact, in light of the technological, regulatory and market structure changes which have occurred in this industry over the past thirty years, it would not be an exaggeration to say that the changes in the telecommunications industry have been without rival among industries over this period.

Less than twenty years ago, the telecommunications industry was completely dominated by "Ma Bell", consisting of AT&T long distance and the local phone companies. But, technological advances in the telecommunications industry have led to the introduction of innovations and pesky entrepreneurs into the regulated and formerly monopolistic market. The continued rapid advancement in the telecommunications technology and the inroads which these firms made into the telecommunications market played a significant role in the historic breakup of AT&T in 1982, with Judge Harold Greene’s Modified Final Judgement (MFJ). Since then, innovation and technological advancements in the delivery of telecommunications services have left the market wide open. What we are left with today is an increasingly competitive telecommunications industry with progressively less resemblance to the pre-MFJ structure.

At the same time, state and local governments in this country have had to come to grips with important changes in the structure of the economy which have affected their ability to raise revenue. One in particular has been the growing importance of services in the U.S. economy. State and local governments have traditionally relied heavily on the taxation of the sales of tangible goods for a major source of their revenue. This shift from production of goods to services has eroded the revenue base of state and local governments. Consequently, in the past few years, states have begun to look more critically at the de facto exemption of intangible services from the general sales tax base. Among these services has been telecommunications services.

Many states, like Utah, now tax "telephone services". However, the definition of the "telecommunications" service which is taxed is not the same across states. There appears to be no generally accepted paradigm for how telecommunications and related services should be defined or taxed. What is a telecommunications service? Who provides these telecommunications services? Which transaction involved in the provision of these services should be taxed?

The problem of taxation of telecommunications is a dynamic one. Even if all states were to agree today on the appropriate taxation of telecommunications services, the rapid development of the telecommunications technologies and markets virtually assures that this agreement would fall apart quickly. With new products, new services, new methods of delivery of these telecommunications services, and changes in the industry structure, what is agreed to as appropriate today will surely be inadequate tomorrow.

In this report, we will attempt to provide a framework within which to analyze these important issues. Initially, we will describe the market in telecommunications as it exists today.
Only through an understanding of the technological engineering and market aspects of this industry can one hope to identify those transactions which should be taxable under a well-defined sales tax system. This overview of the industry should also take into account some of the imminent advances in the industry. Inasmuch as comprehensive studies of this nature cannot be performed whenever a new technology comes on board, it is important that the research be forward-looking, and consider potential future market developments.

II. A BRIEF HISTORY OF THE TELECOMMUNICATIONS INDUSTRY

For the bulk of the 20th Century, telephone service consisted of the delivery of local and long distance voice messages across a basic wire network. The system which delivered these messages consisted of two elements: the lines carrying the electronic messages, and the main switching stations distributing the electronic message from one residence or business to another within an area. In addition, each smaller area was connected through a system of lines and switches which provided long distance service.

In the U.S., the market structure of the industry consisted of AT&T and its component local distribution networks: the national phone "monopoly". There were also a number of smaller independent phone companies, largely operating in the rural areas of the country, which performed the function of local switching and also connected to AT&T's long distance network. Since the industry was virtually monopolized, the U.S. Federal Communications Commission regulated the rates and services of AT&T.

A unique feature of this particular industry was its pricing policy. The system of pricing was based on the "postal service" model. That is, it consisted of rate averaging. The underlying principle of rate averaging is that rates paid by all households should be the same, regardless of location, income, and other economic and demographic factors. Another important element of this system of pricing is the effort to keep local service and access affordable in order to achieve, as nearly as possible, the goal of universal service. To meet this goal, relatively high cost service, such as that in rural areas, was subsidized by high rates (relative to cost-of-service) charged to urban subscribers. In addition, to achieve affordable universal service, businesses were required to pay higher basic charges for service equivalent to those provided to residences. Finally, in pursuit of affordable access to basic telecommunications service, long distance phone calls were also priced highly.

In sum, high prices on some services to promote low-cost universal access to all regions of the country effectively led to three types of cross-subsidies:

♦ Form urban to rural customers;
♦ From business to residential customers;
♦ From long distance service to local service;

There are many excellent summaries of the historical development of the telecommunications industry. For example, see Harry M. Shooshan, Disconnected Bell: The Impact of the At&T Divestiture. Pergamon Press, 1984.
These subsidies naturally lead to a system of pricing which is unrelated to the cost of service provision. The system thus opened up the telecommunications market to potential competition from telecommunications providers who would provide service for those types of telecommunications service which were most differentially highly priced relative to their cost. Appreciation of this fact will get anyone far along the road toward understanding the recent development of competition in the telecommunications industry.

The first important movement toward competition, and an attack on the system of cross-subsidies, was the FCC's "Above 890" decision in 1959. This decision allowed non-regulated firms to provide microwave telecommunications service at frequencies above 890 MHz, opening the door to competition in telecommunications. This action was a precursor to the decision of the firm, Microwave Communications Inc. (MCI) to establish commercial long distance service using microwave transmission. In 1971, the FCC authorized the provision, on an experimental basis, of long distance service between St. Louis and Chicago by MCI. This was the first blow at the foundation of the traditional telecommunications delivery system.

There were soon subsequent legal attacks on the existing telecommunications monopoly. For example, in the Federal court's "Carterphone" decision, competition in the production and sale of electronic equipment used in telecommunications was permitted.

By the end of the 1970s it became clear that the traditional monopolized telecommunications industry structure could not be maintained. Additional, legal challenges to the monopoly long distance and local exchange market began. Ultimately, the Justice Department antitrust action broke up the AT&T monopoly effective in early 1984. AT&T was split up into parts. These parts consisted of the long distance service which was provided by AT&T. In addition, the local telephone networks were broken up into 22 Regional Bell Operating Companies (RBOC). Each of the RBOCs maintained a local regulated monopoly in their defined service areas. These RBOCs would be regulated within each of the states in terms of their pricing structure, service quality, etc. by the state public service or public utility commissions. The RBOCs similarly were required to maintain their efforts at achieving the long run goal of universal service.

An important consequence of the MFJ was the establishment of a new system which provided compensation to the RBOCs and other local exchange companies for the access to their local networks by the long distance companies to complete long distance calls. Through this system, AT&T (and other interexchange companies) were required to pay the LEC a charge based upon the numbers of minutes of use of the local network. These charges are referred to as "access charges". In addition, the individual customers of the local exchange companies (the households and businesses) were required to pay a flat fee to the LEC for the access which the LEC provided to the long distance companies. These charges currently are $3.50 per month and are referred to as Subscriber Line Charges (SLC).

What is significant about the MFJ is that, although it permitted competition in the long distance industry, many of the elements of the overall pricing structure in the telecommunications sector remained. In search of meeting the universal service goal, differentially high prices to business services were maintained in each of the states through their regulatory processes. The subsidy from low cost urban to rural areas was also maintained through decisions at the state
regulatory level. Finally, although it was hoped that the cost-based system of interconnections settlements of the long distance and local service networks would lessen the subsidy through the system of cost-based long distance access charges, many maintain that this has not occurred. 2

There are other important elements of the MFJ, for example, relating to the provision of phone directories and the manufacture of equipment. Most important was the prohibition on the local exchange companies' ability to compete in the long distance market. In short, they were given the local franchise and that was the extent of the services they were permitted to provide.

Over the intervening years since the MFJ there have been a number of other technological and regulatory developments which have fostered increasing competition in the industry. One of the most important was the introduction of commercial cellular service. Although the cellular technology had been in existence since the 1940s, the FCC had moved very, very slowly in approving this technology's use for commercial telecommunications. In the 1980s, the FCC finally permitted the use of part of the radio spectrum for cellular telecommunications and allocated two licenses to each defined area of the country. 3 Since then, cellular telecommunications has become one of the fastest growing sectors in the U.S. economy. Revenues to the industry has been growing steadily at a rate of 30% to 40% per year over the past decade.

Perhaps the most important technological innovation in the industry has been the development of fiber-optic technology. With fiber optics, the signals sent from one location to another are light wave signals, as opposed to electronic. The use of lightwaves to transmit provided the advantage in clarity. The traditional electrical signal requires intermittent boosting of the analog signal. In doing this, distortion is added. Boosting also added to the cost of delivering the signal from one location to the next. Light wave communications through fiber optics required much less boosting making this technology less expensive. While, the cost of the physical fiber optic cable was much higher than the wire cables, the technology has still been more economic.

The continual technological development of the microwave technologies and their ability to improve both the capacity and quality of signaling has imposed competitive pressures on those using the traditional methods of signal delivery. The fiber optic technology, combined with the introduction of digital signaling provided higher quality and lower cost services than the traditional analog technology would permit. This newer and higher-quality fiber optic transmission opened the door wider for a new entrant into the telecommunications field: firms which would provide an alternative, and a higher quality form of access to the interexchange companies for large users of long distance.

Another important development in the industry has been the emergence of unregulated companies which provide telecommunications services which do not technically interfere with the local exchange companies' monopoly on local switched services. One example, discussed in

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3Areas were defined to coincide with the then-existing definitions of Metropolitan Statistical Areas (MSA) and other newly defined Rural Service Areas (RSA).
more detail in the following section, are those firms which provide access to alternative long
distance companies to local firms, although not providing full local services.

III. THE MECHANICS OF THE SYSTEM

Before moving to a more detailed description of the players in the market, it is useful to
describe the physical telecommunications service systems which exist.

As we’ve indicated, there are essentially two forms of delivery of a message. The first is
the traditional wire based system. In this system, analog and digital signals are sent from one
location to the next. Over copper cable (twisted pairs) and coaxial cable or fiber optics. The
second technology for sending messages is through radio waves. This technology requires access
to a portion of the available radio spectrum through which signals are sent.

A. THE WIRED SYSTEM

The traditional local network developed during the years of the telephone monopoly
largely consists of a wire-based network which carries signals from one location and delivers it
to another using switching equipment which connects numbers to physical locations. This is
typically referred to as the “local loop.” Connecting these local systems is the long distance
network, which carries signals from one local distribution network to another.

There are several types of “areas”. First, there are the exchanges. In terms of geographic
extent, exchanges roughly compare to towns.

In addition, the MFJ defined broader areas of coverage for the RBOCs called Local Access
and Transport Areas (LATA). A LATA is defined as an area within which a Bell company can
provide exchange services as a common carrier under its franchise monopoly. While most states
have more than one LATA, the entire state of Utah has been defined as a LATA.

The long distance companies, such as AT&T, carry signals between each exchange and
have concentrated on inter-LATA calling until now. It is for this reason that the long distance
companies are referred to as Inter-exchange companies (IXC). The revenue for these companies
consists largely of toll revenue from customers.$

To complete a long distance call, the long distance companies need to “hand off” the call
to the LEC with the monopoly in the area of the receiver of the call. To do this, each of the long
distance companies establishes a Point of Presence (POP). It is at this POP that the long distance
carrier turns the signal over to the LEC and pays the access charges to the LEC referred to earlier.
A similar process usually takes place at the originating end of a call.

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$Appendix A provides schematic drawings of the traditional telecommunications network, as well as those
for the newer entrants into the field.

$The local exchange companies may also obtain toll revenue for long distance calls made within a LATA.
B. LOCAL RADIO BASED SERVICE

As we indicated earlier, one of the most important technological and market innovations has been the use of microwave technology for communications purposes. Initially these IXC used large towers to transfer the signal from one location to the next. Later on, cellular technology permitted the making and receiving of phone calls within a local network without necessarily using the local wireline grid.

The FCC permitted two cellular licenses for each of the MSA and RSA (Rural Service Areas) in the country. One license was given to the LEC providing service in each region and the other was granted to the winner of a lottery process (and the licenses could subsequently be sold on the open market). All areas of the country were served by two cellular services operating in their pre-defined areas. In a sense, the areas are similar to LATAs. These cellular carriers would use their networks of cells to carry calls which originate or terminate and that did not necessarily use the local wired network. However, for someone to make a phone call from a cellular phone to a traditional phone (or vice versa) requires the same kind of access to the local network which the IXCs require. Systems of access charges to the network for the cellular carriers have been established.

Cellular calls are attractive because they provide the benefit of mobility. A person need not be tied to the wall in order to make a call. He can be in his car. This mobility can present its own set of problems which a traditional phone network does not have; specifically, making phone calls from beyond the FCCs pre-established regions. A resident of Salt Lake may travel to Laramie to make a call. In making this call, however, he will be using the facilities of the cellular carriers in the Laramie region. The system of settlements for these charges is similar to the system of access charges with the LECs.

IV. WHO ARE THE ACTORS

Now armed with the regulatory history and the technological structure of the telecommunications industry, we are at a point where we can systematically define the actors who operate in this industry. Although each persons list of “Actors” will differ, we have identified eleven such entities.

A. LOCAL EXCHANGE COMPANIES (LEC)

The local exchange companies (LEC) are those companies which currently maintain the local loop which distributes phone calls to and from households and businesses on their networks or in their region. The LEC has traditionally maintained the franchise monopoly for these local

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6A cell is an area served by a transceiver. When a caller drives from the area served by one transceiver to another, one transceiver hands off the attending of that call to another transceiver.
services. At the breakup of AT&T, the LECs consisted of 22 RBOCs with seven regional Bell Holding Companies and a number of the local rural exchange companies. Since then, a non-RBOC company, GTE, has become the largest major provider of local switching service throughout the country through purchases of other providers.

The LECs, as indicated, were given a local franchise monopoly. With this monopoly, the LECs also have access to the right-of-way in that region. In exchange for the franchise and right of way the LECs are regulated (and also typically levied a franchise tax). This regulation traditionally was in the form of rate of return and price regulation. The quality of service provided by the LECs are also monitored by the state regulatory agency. In addition, the LEC are required to strive to achieve the goals of universal service as their prices are regulated and they are required to serve all. To achieve this goal in the post-MFJ environment, a system of levies on minutes of telephone usage was established by the FCC with proceeds used to subsidize telephone service in high cost areas. In Utah, a companion program exists (the USF - Universal Service Fund) which provides subsidies to smaller phone companies to expand their system and offer low-priced service.

As indicated earlier, the MFJ prohibited the LECs from entering into the long distance market. However, this prohibition will fall very soon. The Telecommunications Reform Act recently signed into law will permit such competition.

In Utah, there are currently fourteen local exchange companies. By far, the largest is U.S. West. The other local exchange companies are listed on Table 1.

### TABLE 1
LOCAL EXCHANGE COMPANIES [LECS] IN THE STATE OF UTAH OTHER THAN U.S. WEST

<table>
<thead>
<tr>
<th>Company Name</th>
</tr>
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<tbody>
<tr>
<td>Albion Telephone</td>
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<tr>
<td>All West Communications</td>
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<tr>
<td>Beehive Telephone</td>
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<tr>
<td>Central Utah Telephone</td>
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<tr>
<td>Citizen's Telecom</td>
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<tr>
<td>Eagle Telephone Inc.</td>
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<tr>
<td>Emery Telephone</td>
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<td>Gunnison Telephone</td>
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<tr>
<td>Manti Telephone</td>
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<tr>
<td>Navajo Community Co.</td>
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<tr>
<td>South Central Utah Telephone</td>
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<tr>
<td>Uintah Basic Telephone</td>
</tr>
<tr>
<td>Union Telephone</td>
</tr>
</tbody>
</table>

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B. INTEREXCHANGE COMPANIES (IXC)

The IXCs are the companies which carry signals between the local exchanges; in other words, these are the long distance companies. They have built systems of wires which carry signals to all points in the U.S and the world. They interconnect with the local exchange companies to complete these long distance calls. At this time, there are at least four nationwide long distance networks and scores of regional networks.

It is among the long distance carriers that competition in the traditional phone market has come first. Since the introduction of long distance competition in the 1970s, several major competitors have arisen: MCI, Sprint and, more recently, WilTel. As can be seen in the accompanying graph, AT&T remains the major interexchange company in the country but it's share of total activity has fallen significantly.

The long distance companies also provide one-way (unidirectional) non-voice service on their lines. For example, computers are connected to each other with long distance lines. The providers of the on-line connection for transmission of data rent the lines of the IXCs for this purpose, as do broadcasters.

C. LONG DISTANCE RESSELLERS

A long distance reseller is essentially a company which leases the services of an existing long distance carrier in bulk and then resells these lines to businesses and consumers. A reseller is essentially a wholesaler of long distance calls. Major long distance companies, like AT&T, Sprint and MCI, have installed a tremendous amount of capacity. Reseller will purchase use of existing "excess" capacity in bulk. Once this usage has been purchased wholesale, the reseller then sells long distance time at a fee lower than the IXC retail rates to smaller customers. In a sense the resellers are acting as agents for the major interexchange companies, providing use for the existing long distance excess capacity.

There are essentially two types of resellers: facilities-based and non-facilities based. A facilities-based reseller is a company which has the equipment necessary to provide services for customers, such as billing and repair services. The other kind of reseller is frequently called an "aggregator" or non-facilities-based carriers. All an aggregator will do is to solicit the business of long distance customers, and deliver this business to the company to whom the access has been purchased.

Although, in the telecommunications industry, the term "reseller" has traditionally been associated with long distance service, the concept of a reseller is much broader. In its most general application a reseller is anyone who rents the facilities of one provider and sells them independently. For example, a cellular company may purchase accounts and usage from the cellular companies which currently hold one of the two cellular licenses allowed in each region of the country and then re-sell this service.
D. COMPETITIVE ACCESS PROVIDERS (CAP)/ALTERNATE EXCHANGE CARRIER (AEC)

On the breakup of AT&T, the system of access charges was established by which the IXC's would pay the LECs for the services of distributing calls in their areas. The local exchange companies were not allowed to "price discriminate" between long distance carriers. That is, charges per unit of service were the same for all carriers, no matter the volume of calls. This system of charges was also established with artificially high margins with prices set well above costs. For example, large heavy-use urban business users of long distance services could be thought of as paying high access charges: high in the sense that the access charge revenues they generate exceed the cost their usage impose on the local distribution network. As such a heavy user (or consortium of users) of long distance service could find it more economical to exploit their economies of scale by building their own direct access to the IXC's POP. This is what CAPs do. The providers of access to long distance are referred to as Competitive Access Providers (CAPs).

The CAPs provide two types of access. First, the CAP can simply construct a line directly from a very large user's location to the interexchange company's POP, avoiding the LECs access charge. From there, the call is transmitted to its final destination. In addition, the CAPs have installed their own switches and provide a full range of competing local services.

In Utah, there are three major CAPs.

- Phoenix Fiberlink Utah, Inc.
- Electric Lightwave Inc.(ELI)
- Qwest Communications Corp.

Now, because of Utah's Telecommunications Act of 1995, the CAPs are able to provide full local service; that is, they can compete with the LEC for local service. They may do this by building their own new entire local network or they rent loops connecting them to customers from the existing LEC (or from the local cable company). These CAPs will then become a full-service alternative to the local network. Thus, in recent months many have begun to refer to the CAPs as Alternative Exchange Carriers (AECs).

This move to local exchange competition is already well along in Utah. Already two companies, Phoenix Fiberlink and Electric Lightwave (ELI) have been given certificates to provide these services. They could begin full local service in a few months depending on how the details of the interconnection with the LEC (such as number portability and interconnection fees) are decided in proceedings going on now at the Utah Public Service Commission.

E. CELLULAR

Cellular companies are providers of radio-based telecommunications services. The technology for cellular communications has existed since the 1940s but approval for its use was not given until much later in the 1980s.
Cellular provides the customers with the advantage of mobility. They need not be near their homes in order to use cellular. The cellular customer can connect directly with another cellular customer (by-passing the local exchange company), they can connect directly with an IXC (again, by-passing the LEC) and finally, they can interconnect with the LEC's system.

The FCC allocated two licenses for use of the cellular spectrum. One of these licenses went automatically to the LEC in that area. In Utah, this license is operated by US West. The other is operated by AT&T. However, many other providers cellular service purchase cellular service in volume and resell this service under their own name. That is why, although there are only two licenses in any region of the country, there are many more cellular providers.

The cellular customer purchases or rents the radio, he pays a flat monthly fee for access to the wireless network and, finally, he is charged on a measured service basis for air time. Should the user make a traditional long-distance call, he will pay the long distance rate charged by the IXC company with whom the cellular company (of the user) has the agreement.

As indicated, the true benefit of the cellular technology is the mobility it permits the user. He or she can use this phone in the car. However, the cellular service area is often geographically very small and many users will move from the geographic area of one cellular provider to that of another. At this point, the customer is using the equipment of a cellular company to which he does not subscribe nor pay for access to. To permit this same mobility, the cellular companies have established a system of charges which customers must pay for the right to use the cellular equipment of a different cellular company. These are referred to as roaming charges.

The cellular telecommunication industry is expanding very rapidly. Over the past few years, the numbers of subscribers has grown at rates between 36 and 44 percent per year. According to the Department of Labor, in 1993 there were 24 establishments in the radiotelephone (cellular) industry in Utah.

F. PERSONAL COMMUNICATIONS SERVICES

An ongoing development in the radio-based telecommunications technologies has been the approaching introduction of Personal Communications Services. The PCS licenses allow more flexible uses than the cellular licenses and, of course, are for somewhat different portions of the electromagnetic spectrum. Technologically, there are many similarities between PCS and cellular. Both transmit radio-based signals to cells, which then pass them to other cells and finally to the recipient (either directly or through the LEC). In fact, many in the "wireless" industry have trouble finding a meaningful distinction between the functional value of cellular and PCS.

The substantive difference between cellular and PCS is the design of the system. A PCS network will consist of a greater number of fixed "stations" to receive and transmit a signal than does the current cellular system. Because of the greater number of cell-sites, the signal sent from the portable customer-held equipment need not be as strong. Because of this, use of the PCS system saves power in the user's portable battery-powered unit. Hence, the battery life of the PCS equipment will be longer, and thus preferred by the customer. The downside, of course, is the need on behalf of the operator of the PCS system to find locations for and to build many more stations or cell-sites.
The PCS and other wireless market are expected to grow dramatically in the coming years. A recent review of projections of growth in this industry shows that analysts expect subscriber growth in the range of 260 percent to 470 percent by the end of this century.7

The FCC is currently auctioning off rights to use the spectrum for PCS. When the auctions are completed, each area will be allocated six additional licenses for PCS. To this point, two of the six have been auctioned. When completed, the PCS system will have 3 ½ times the capacity of the existing cellular capacity.

G. Paging Companies

Paging companies are one of the newest, or to some, one of the oldest entrants into the telecommunications markets. Paging companies traditionally provided a one-way notification service. A one-way signal would be sent from a base to a station leading to a "beep" notifying a remote user of his need to retrieve a message. More recently, this beep has been delivered along with the delivery of a message, such as the display of a phone number of the place from which the page had emanated.

With this old technology, many did not consider paging to be a part of the telecommunications complex. However, development in paging technology have rendered its services more akin to telecommunications services. Several years ago, it became possible to establish two-way paging services. With this service, once an individuals has been "beeped" he could return a short message back to the original source. This, in a sense, establishes two-way communications between sources, similar to the telephone company services, although not voice communications. A second major development has been the ability to provide alpha-numeric messaging between these locations. With the service, once a person has been beeped, he can return a more extensive message. With these enhancements many analysts have come to consider paging as an alternative to the traditional telecommunications service.

The distinguishing characteristics of paging telecommunications services are two. First of all, paging companies do not provide voice transmissions. Second, paging services, at this time, do not tie into the traditional network of the common carriers. For example, it is not possible to deliver a message through the local exchange companies. They can also tie into the DXC equipment or satellite to carry long-distance messaging service.

H. Cable

Cable companies are similar to the LEC in many ways. First, like the LECs, cable companies must develop a network of lines and a distribution network for its signals. Like the phone companies, this consists of many miles of cable from the source to the customer. The

second similarity is the existence of the franchise monopolies. Like the phone companies, the cable companies have often been given exclusive rights to operate in particular geographic region. The cable company is typically given a franchise in a municipality while the LECs territory (the LATA) can sometimes be as large as a state. Along with the franchise monopoly, the services are subject to oversight by the "regulatory authority", which would typically be the municipality. Unlike the local phone companies, cable companies are currently price regulated by the FCC, which has permitted municipalities to regulate if the FCC rules are followed.\(^8\)

The current differences between the cable company and a phone company are the following:

1. The cable companies generally provide one-way transmission of signals, versus the two way service of the phone companies.

2. The cable companies do not provide switched access to other cable customers; that is, customers cannot communicate directly with each other.

3. The cable companies provide "broadband" service, permitting the delivery of video, versus the narrowband service of a phone company, which generally provides just voice and data transmission.

In recent years, the cable companies have implemented technologies which would allow two-way signaling. Through the existing wired cable network, customers are able to send signals from their residence to the central station. This has been used to order particular programming.

Given the existence of their wired network and the ability to provide narrowband telephonic services, there is no reason that cable companies will not soon provide such two-way, switched service. In fact, there is plenty of reason to expect them to do so. At this point, the cable companies have a fairly high penetration rate across the country, about sixty percent. Moreover, cable's lines pass by a much greater share of all households than their current penetration rate indicates (those not currently subscribing to cable service). Nationally, cable systems pass at least 95 percent of all households.

I. **VALUE-ADDED NETWORKS (VANs)**

VANs specialize in using a technology known as "packet-switching". Because of the nature of the product deliver by the VANs, largely data (as opposed to voice), packet switching is more acceptable for data transmission. With packet switching, digitalized information is sent over traditional phone lines in packets sharing a physical connection with other packets preceded by addressing information. These packets consist of data of a digitalized nature. Under packet switching the information is routed across the telecommunications infrastructure in the most

\(^8\)This price regulation will likely disappear, should the current Federal telecommunications bill pass.
technologically efficient way. The information could be routed to various parts of the state, country or world to make the best use of available transmission infrastructure. The full message of a data file is ultimately routed to the final destination, where it is then reassembled. This is fine for data, but problematic for voice transmission since the signals may not arrive at their finale destination in a smooth sequence, causing the potential for noticeable lags in the voice transmission as the digitalized voice is reassembled at its destination. Some of the services include data bases, E-mail and on-line access.

J. **Natural Gas Companies**

Natural gas companies distribute natural gas from its source to the ultimate users. The infrastructure required to accomplish this includes large pipes which cross the country. With the introduction of the fiber-optic technology (versus electrical signaling) it became possible to transmit signals along side the natural gas pipelines. Given the broad geographic coverage of the pipeline system, they could then provide long distance services.

The natural gas companies can be considered competitors to the interexchange carriers. The importance of the natural gas companies in the telecommunications industries is best illustrated by the fact that Mountain Gas is the largest provider of interexchange services in the state.

K. **Electric Companies**

Like the LECs and Cable, the electric companies are required to build a network which deliver a service from the source to users, in this case, electricity. In recent years, these companies have begun to use their network to provide a sort of two-way communication between the main station and the ultimate user. They have strung fiber-optic cable along side their electric cable to communicate for load management purposes. For example, signals will be sent from the main offices to customer premises, with customer permission and a financial incentive, to allow the electric company to turn-off particular appliances during peak periods.

This infrastructure provides the capacity to provide two-way voice and data communications. Like the cable companies, the missing element of infrastructure is the switching equipment, which would allow the signal to be carried from one user to another.

Although two-way switched service by electric companies is less imminent than with, for example, cable companies, the potential certainly exists.

L. **Public Pay Phone Operators**

Traditionally the LEC provided public pay phones. In recent years, separate businesses began to provide public pay phones. The services are basically the same as those provided by the LECs. There have been several market developments. Many of the newer phone companies will
charge a fee per minute of usage. Second, some of the public phone companies will contract with an individual provider of long distance calls.

M. THE INTERNET AND INTERNET ACCESS PROVIDERS

The Internet was originally developed by the Department of Defense in order to increase the ease of data communications between Defense Department computers. In the last several years, the access to the world wide web has led to the expansion of use to include many businesses and households. As it stands, individuals and businesses can establish locations (corresponding to phone numbers). From these locations they can receive and send messages.

Although the Internet "backbone" was originally owned by the government, many of these lines have been sold to businesses, particularly IXCs. With this framework, a new entity has entered the market. Internet access providers purchase access to this backbone from the IXCs. They then resell this access to users of the Internet. The IAP provides the software necessary to facilitate interaction and message transmission across the Internet. The charges are usually monthly fees for their access, but often include monthly charges for usage. The internet backbone provides the functional equivalent of switching.

N. SATELLITE

The satellite companies essentially provide an alternative to the transmission of signals by direct radio-wave and to towers of the cellular networks and microwave long distance. Very long distance paging, for example, can make use of satellites, as can long distance carriers. Cable companies have long used satellite to receive one way video programming signals.

The utilization of satellite for telecommunications services is expected to grow significantly over the next decade.

V. TRANSACTIONS IN THE TELECOMMUNICATIONS INDUSTRY: A SUMMARY

This section provides a summary of the information provided in the previous two sections. The transactions which take place in the telecommunications market, what each of the actors "buy" and "sell", will be presented.

A. LOCAL EXCHANGE COMPANIES

Sell: The LECs provide local service to businesses and households, which is charged as a flat monthly fee. In addition, the LECs offer their subscribers enhanced services, such as call waiting and caller ID. These charges are typically fixed monthly add-ons to the basic bill. In addition, the LECs can provide toll service. However, the LECs are prohibited from offering
long distance service beyond the LATAs within which they operate. Thus, they only sell Intra-LATA toll service.

The LECs also sell access to their local switched network to the interexchange companies and cellular companies. In the future, as competition in the local market becomes a reality, the LECs will also sell access to the CAPs the cables and other entities wanting to tap into the existing network.

The LECs also own the bulk of the pay phones currently in existence.

The LECs also provide and re-sell cellular service. That is, they can buy access to the spectrum of the existing cellular companies and re-sell that radio-based service.

Finally, in the future, the LECs will be allowed to provide the same type of video service as the cable companies.

Buy - To provide their services, the LECs must build and maintain the local switched network. This includes both the lines and the switches. Also, for its intra-LATA toll service, the LECs will sometimes rent the facilities or lines of the interexchange companies. Likewise, for cellular service the LEC will rent some of the capacity of the cellular companies.

In the future, when the telephone companies begin to provide cable services, they will need to purchase the programming, either from existing local television stations or cable companies or receiving them directly from satellites, as the cable companies currently do.

B. INTEREXCHANGE COMPANIES

Sell - The IXCs sell long distance services to businesses and households. In addition, the IXCs will rent their excess capacity to the long distance resellers and to the Internet Service Providers.

Buy - To provide these service, the IXCs must build the long distance network of lines and microwave transmission towers. Also, through the access charges paid to the LECs, the IXCs purchase access to the local switched network. A similar arrangement is, or will be, made with the CAPS and cable companies, as they build their own local networks.

C. LONG DISTANCE RESELLERS

Sell: The long distance resellers sell exactly what the name implies - long distance service to households and businesses, usually at a rate which is discounted from the rates charged by the traditional IXCs.

Buy: To provide this reselling service, the resellers must rent the access to the lines of the IXCs. As indicated, some of these resellers are classified as “facilities-based” resellers. This indicates that they own the equipment to provide service to their customers and, in fact, some have installed some of their own lines.
D. CABLE COMPANIES

Sell - Cable companies primarily sell televised video services. In many areas, cable companies will also sell access to their existing cable network to CAPS and to IXCs for long distance calls. In the near future, cable companies will offer telephonic services.

Buy - To provide the video services, the cable companies must purchase the programming and they must purchase (and maintain) the cable to distribute the signal. In the future, as cable companies begin to provide telephonic services, they will need to purchase access to the existing local switched network from the LECs, and ultimately they will install their own switching equipment.

E. CAPS\AECs

Sell - The CAPS currently sell access to the long distance network to large business users. Soon CAPS (AECs) will provide local exchange services.

Buy - To provide the current access to the IXCs, the CAPS must purchase the lines and equipment to carry the signal. To provide local exchange service, the CAPS (AECs) will need to either lease access to the local switched network from the LEC or the cable companies, when the cable companies install their own switching equipment. Finally, it is conceivable that sometime in the more distance future, the AECs will build their own unbundled loop.

F. PAGING

Sell - The paging companies sell one and two-way messaging services. They are sold primarily to businesses but the consumer market is growing very rapidly. The paging companies also sell the personal equipment.

Buy - To provide the service, the paging companies must have access to radio spectrum to carry the signal. For longer distance paging services and for longer messages, the paging company may lease access to the IXCs equipment or that from a cellular company.

G. CELLULAR/PCS

Sell - The cellular and PCS companies sell telephonic services. They provide direct cellular to cellular service, access to the local loop and long distance service. The long distance service may be through an existing IXC or directly through a fully cellular network. The cellular companies also sell access to their equipment to customers of other cellular companies (roaming charges). Finally, they also sell the cellular equipment.
Buy - To provide this service, the Cellular/PCS companies must have the equipment for their network, the towers or cell-sites. They must also now purchase the access to the radio-spectrum from the FCC. To connect with customers of the local loop for full local service, the cellular companies must purchase access to the local loop. To provide long distance service they may go through the IXC's, in which case they must lease access to their lines, or they may send the long distance signal using towers of other companies, in which case they must lease access to the other cellular company's equipment and spectrum. Finally, as cellular companies attempt to provide a "seamless" network, the individual cellular companies will need to strike deals with each other on a method of financial settlements for interconnection of the cellular companies.

H. PUBLIC PAY PHONE COMPANIES

Sell - The public pay phone companies provide local and long distance service from remote locations.

Buy - To provide this service, the public pay phone companies must purchase the physical equipment and must also purchase access to the local loop from the LECs as well as operator services. They will also arrange deals with particular IXC's or long distance resellers to provide long distance services.

I. SATELLITE COMPANIES

Sell - The satellite companies sell signal transmission. This service is sold to cable companies, IXC's, and paging companies.

Buy - The satellite companies purchase the satellite equipment itself and the "transport" of this equipment to its location in space, usually from NASA or from other countries' space programs.

J. VALUE-ADDED NETWORKS

Buy - The VANs primarily sell access to a network of computers. They will also provide for enhanced telecommunications services, such as teleconferencing and remote alarm monitoring.

Sell - To provide this service, the VANs must purchase their own computer equipment. They must also purchase the means of transporting the signal: local service and access to long distance services.
K. NATURAL GAS COMPANIES

Sell - In the telecommunications market, the natural gas companies see long distance service to IXCs and to resellers.

Buy - To provide this service, the natural gas companies must purchase the fiber optic lines which are strung through their pipeline.

L. ELECTRIC COMPANIES

Sell - The electric companies currently have the technical capability of providing long distance service. In the future, the electric companies will be able to provide some telephonic services. Through their local loop, they may provide local switched service.

Buy - To provide this service, the electric companies must purchase the fiber optic lines (which they string along their traditional power lines). In the future, should the electric companies enter into the provision of local switched service, the electric companies will either need to purchase access to the local switched network, or purchase their own switching equipment.

VI. THE TELECOMMUNICATIONS REGULATORY ENVIRONMENT IN UTAH

A. THE CURRENT REGULATORY ENVIRONMENT

The structure of the regulatory environment in the telecommunications industry has undergone major reforms among the states over the past several years. With the passage of the Telecommunications Reform Act of 1995, Utah has joined in this revolution.

The telecommunications industry is regulated in two substantive ways. First, there are currently restrictions on the pricing and rate of return to operations in the local exchange market. Second, there have been barriers to entry into the local exchange market, with franchise monopolies granted to the local exchanges. Both of these types of traditional regulation are currently under challenge, nationwide.

Although these regulations generally apply to the local exchange market, although there are some states which regulate the cellular industry and there is some residual regulation in the long distance market.

1. Rate of Return and Price Regulation

Major public utilities have traditionally had their pricing policies regulated in several ways. First, public utility regulators - the Federal Communications Commission at the Federal level and
the state public service commissions at the state level have imposed price/profit constraints or administrative constraints on firms. Since these utilities have traditionally been considered natural monopolies, the potential existed for these utilities to extract excess profits through monopolistic pricing. Therefore, the pricing and profitability of the telephone companies have been regulated. In exchange, the phone companies were granted a protected franchise monopoly.

The most prevalent type of constraint has been restrictions on the allowed rate of return for the firms. The public utility would, under this system, be required to obtain approval for their pricing structure to insure that these prices did not lead to excessive rates of return on investment for the firms.

This had been the dominant form of regulation on telecommunications firms local exchange companies until very recently. Telecommunications firms began to argue forcefully in the 1980s that this system of rate of return regulation led to an unproductive, even perverse, system of incentives. They argued that, in an industry which was undergoing such tremendous technological change and in which the cost of service was falling as a result of these innovations, rate of return regulation did not provide the regulated local exchange companies with incentives necessary to undertake the kinds of new infrastructure investment necessary to exploit these new technologies and reduce the cost of service. Under rate of return regulation, reduced costs lead to reduced prices and do not change the operator's profitability. Thus, there is no incentive to look for, or adopt, cost-reducing technologies. The regulated industries argued, instead, for direct price regulation.

Under a system of price regulation, the public regulatory commissions would set maximum allowable prices - not maximum rates of return. The maximum allowable price would be permitted to change year-over-year based upon factors such as the rate of inflation and technological changes in the industry affecting the cost of service. A local exchange company could retain any additional profits which were obtained through new investment. In such a situation, the consumer is still protected from monopolistic price gouging and the local exchange company has an incentive to undertake the new investment.

There is also a variant of this price-cap incentive regulation. In a hybrid of rate of return and price regulation, the regulated utility would be permitted to keep a share, rather than all, of any increased profits it received as a result of cost-reducing and service improving technological innovations. Typically, the utility is allowed to keep about half of any rate of return above the public service commissions "maximum."

A fourth type of modern regulation is a variant of the traditional rate of return regulation. This regulation attempts to retain the control which the commissions have over excessive profitability of the monopoly while, at the same time, allowing an incentive to increase services other than basic services. For example, while rate of return regulation on basic services would be retained, the LEC could reap "excessive" profits for the provision of enhanced services, such as call-waiting. This form of regulation is referred to as "Basic/non-Basic" distinction.

Although the LECs have been the main "target" of regulation, other participants in the industry have also been fingered for regulatory treatment. First, AT&T, as the "dominant firm" in the long distance industry, had been price regulated by the FCC and the states. AT&T was required to request changes in prices and to get approval for these changes. In October 1995, this
requirement for price change approval for AT&T was suspended. The long distance market is now virtually unregulated, subject only to oversight.

2. Barriers to Entry

The other form of important regulatory restraint on the industry imposed by state public service commissions are formal restraints on entry into the local exchange market. The rights to the provision of local telephony services has been a protected franchise monopoly since the days of "Ma Bell". Even after the MFJ, these franchises for local service were allocated to the independent RBOCs and other LECs.

In recent years, the significance of "by-passing" of the local network has grown. The CAPs become more significant players in the market. Cellular technology has become a significant elements of the market and private PBXs have grown in importance as well. It became clear to many that the concept of the local franchise monopoly in local service had less and less relevance. Competition was encroaching on the LECs market, whether the regulators and LECs wanted it or not.

In many states, the regulatory Commission have taken the step to acknowledge the existence and growth of this competitive activity. In some states, the regulatory structure has been changed to, in fact, encourage the development of this competition. The precise forms of such state encouragement of competition in the local market differs from state to state. Typically, however, this type of deregulation has several important elements.

First, these laws explicitly permit competition with the LECs. Usually the approval consists of a background check of the company and some judgement as to the long-term reliability and worthiness of the applicant, so as to avoid undue disruptions to service for customers.

Second, the competition in the local exchange markets has been further encouraged through the adoption of plans which would require the "interconnectivity" with the existing switched network by the local exchange company (LEC). In short, mandatory interconnectivity means that each provider of local exchange service, such as the LEC, cannot deny other providers to inter-connect with their exchange networks. For example, a CAP may wish to provide full basic service to its customers, allowing them to call anyone in the area, not just their own customers. The CAP has the ability to tie in to the LEC's distribution network. Of course, the LEC (or any other local exchange service deliverer) can charge for this right. In the absence of restrictions on the price charged for this inter-connectivity, the potential exists that the LEC may effectively maintain its monopoly service by charging excessive fees for the interconnectivity. To guard against this, the current plans to induce competition contain provisions which require the Commissions to ensure that the fees for interconnectivity are reflective of true costs.9

Finally, many of the new entrant into the telecommunications industry insist that the market cannot be truly competitive unless they are offered the option of "number portability".

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9It is important to note that other potential providers of local service, such as cable companies, are also required to provide interconnection access.
Number portability is the ability of a subscriber to choose one or another local service provider (the LEC, the CAP/AEC or cable companies) without the necessity of changing the phone number upon changing providers. They reasonably argue that it is very unlikely that a customer would opt to switch local service providers if they are forced to get a new phone number. Such a switch would be very costly, particularly for business customers.

B. **THE CHANGING UTAH REGULATORY ENVIRONMENT**

The state of Utah had, for some time, been behind the curve with regard to changes in its regulatory structure. However, with the recent passage of the Telecommunications Reform Act in early 1995, the state of Utah is now as far along in terms of exposing the industry to competitive pressures as any other state.

With the Telecommunications Reform Act of 1995, the state of Utah moved into the category of "price regulation". Beginning in 1997, the local exchange companies will freeze their maximum tariffs or prices for three years at the then current levels. In 2000, these prices will be allowed to rise at a rate up to some maximum rate of increase, which will be determined by some as-yet unspecified formula designed to measure the rate of change in the cost of service provision, taking into account the rate of inflation and cost-reducing technological change in the industry.

The most important aspect of the Telecommunications Reform Act of 1995 is its allowance for competition into the local exchange market. Cable companies, CAPs/AECs, cable and other providers may enter the local exchange market once they are granted approval (Certificate of Convenience) from the Utah PSC. The LECs, under the current law, are required to provide access to the existing switched network and to work toward a plan for number portability.

All things considered, the State of Utah, after some years of lagging, is at or near the forefront in terms of its regulatory environment.

C. **CURRENT FEDERAL LEGISLATION ON TELECOMMUNICATIONS REGULATION**

One of the most important elements of the proposed new federal legislation is the preemption of state restrictions on entry into the local exchange market. While stated in terms of a preemption of state policies, for the State of Utah, this provision is of no relevance. With the passage of the Telecommunications Reform Act in Utah in 1995, the state's policies, unlike many other states, are in accord with the intent of the Federal legislation.

The Federal Government has also taken steps to further enhance the competitive environment within which Utah must operate. In particular, as a part of the 1993 Budget Resolution, the Federal Government auctioned off increasing amounts of the radio spectrum for use by cellular and PCS companies. In fact, the amount of spectrum to be auctioned off in 1995 and 1996 will represent three and one-half time the amount of spectrum capacity currently available to this market. This clearly has the potential to greatly increase the level of competition in the telecommunications market.
VII. THE EMERGING COMPETITIVE ENVIRONMENT IN UTAH

In light of the growth in the size and breadth of the telecommunications industry, with its many new entrants, and also in light of the deregulation of the industry, the market is certainly about to become more competitive. A question which arises is the potential impact of recent technological and regulatory developments on competition in the industry in the State of Utah. What will likely be the degree of increased competition in Utah? Is there anything peculiar about the market structure or other elements of the environment which may indicate that Utah will not share in this changing market structure.

In short, the answer is that Utah appears well placed to share in the increased competition. There are four reasons.

First, the population center of the State, the Wasatch Front, provides an excellent physical situation for competition. Nearly eighty percent of the state's population resides in these densely populated valleys. Given that these compact, densely populated areas are most attractive to prospective entrants into the market, it is likely that competition will be relatively intense in the state - at least this portion of the state.

Second, the CAPs already operating in the state have provided strong evidence that competition in the local markets may be intense. Almost immediately following passage of the Telecommunications Reform Act, two of the three CAPS operating in Utah filed for permission to enter the market. This, too, attests to the relative attractiveness of the major Utah market for telecommunications competition.

Third, cable companies are expected to be major competitors in this market nationwide. The largest provider of cable service in the state is TCI. Nationwide, TCI has been pouring significant amounts of funds into the upgrading of their infrastructure necessary to provide telephonic services. To the extent this is indicative of a corporate strategy to tackle the potential telecommunications market now available to the cable companies, this would seem to indicate that Utah stands well-poised to share in the benefits of deregulation. Independent of the cable companies' decisions whether to build the necessary telephonic infrastructure, the new telecommunications law in Utah guarantees that the cable company will be able to interconnect into the existing LEC loop. Cable companies may find this a more attractive short term strategy for building a sufficient market prior to making the more substantial investment in physical plant.

Fourth, it is certainly the case that competition will thrive in an environment in which the existing customers are less satisfied with the incumbent provider of the service. Over the past few years, the volume of complaints about US West's performance has risen to unacceptable levels. The lags in connections and repairs have led to many complaints to the Utah Public Service Commission concerning the poor service and the Commission has held hearings on this issue. US West maintains that much of this delay is a result of the very high rate of growth in the state's population and employment in recent years. In fact, over the past year, the rate of growth in employment in Utah was highest in the nation. However, regardless of the source of the
delays and perceived inadequacies in the performance of US West, the perception exists that performance could be better and that new competitors could find a ready market in the state.\textsuperscript{10} There are, however, some reasons to suspect that competition may be slower in arriving in Utah than elsewhere. First, the penetration rate of cable companies in Utah is the lowest in the nation. Thus, the potential market for telephonic services from existing cable subscribers is lower in Utah than elsewhere, which may inhibit the development of this market in the short run. Second, in Utah, the number of households per mile, an important consideration in infrastructure investment decisions, is quite small. This, too, may inhibit the development of competition, particularly in areas which do not already have access to cable because of this low density (outside of the Wasatch Front). Nonetheless, as a reminder, it is not necessary that the cable companies make the new investment in infrastructure in order to enter the local exchange market. The new Utah telecommunications law requires that the competitive local exchange companies be provided interconnection to the LEC. In discussions with members of the cable industry, however, industry representatives noted that their plans for entering the market would be slowed or put on hold until the details of the interconnection agreement and number portability issues have been finalized. Their assessment was that cable's full force entry into the Utah telecommunications industry would be cautious until these specifics have been ironed out.

VIII. EMERGING TECHNOLOGIES AND THE FUTURE OF THE TELECOMMUNICATIONS INDUSTRY

This industry is a particularly technologically vibrant one. New technologies are introduced on a seemingly routine basis, each promising higher quality, lower cost and a wider range of services.

Though many new innovations and technological advances have blessed the industry in recent years, there is just as much more advancement on the horizon.

These potential innovations and technological advancements fall into three forms:

\begin{itemize}
  \item those increasing the capacity of the existing system;
  \item those reducing the cost of service;
  \item those providing new services and products to users.
\end{itemize}

First, technological improvements in laser technology will effectively increase the capacity of the system. With these improvements, more calls can be carried on the existing fiber optic cable.

Second, new compression technologies will allow a greater amount of information, be it voice, data or video, to be transmitted over a single physical channel. Compression technologies

\textsuperscript{10}In this regard, the experience in Rochester, New York, one of the earliest participants in the competitive telecommunications market, is instructive. Many of the new providers of local service have had trouble gaining customers. One reason frequently cited is the satisfaction of residents with the local LEC, Frontier.

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are those which take a given amount of information and make it more compact. For example, with appropriate software "redundancies" in a signal can be identified and replaced with alternative coding which is then un-coded at the receiving end. This reduces the amount if information that must be transmitted, again increasing the capacity of the existing system. These innovations will reduce the potential infrastructure costs of entering the market and will help to further reduce the cost of services.

Another technology, which has been available for some time but has not yet made significant market inroads, is the ISDN technology. ISDN is a system which allows an existing copper wire to act like the broader band fiber optic cable. It allows a single line to carry the equivalent of two "bearer" lines. This will permit voice, data, FAX and video to be transmitted over one line simultaneously. This also increases the capacity of the system and also makes new services available to, and affordable to, users.

A new technological advance in the radio transmission also promises to increase the capacity of the radio spectrum. One such innovation, Cellular Digital Packet Data (CPDP), will increase the capacity of radio-based technologies by permitting the transmission of data interspersed with voice transmission. Potential uses of this technology include transactions-oriented services, fleet management, emergency messaging and on-line data services operating through the radio spectrum.

The potential for laser-activated switches holds great promise for reducing the cost and speed of switching, yielding higher quality and lower cost for consumers. The cost of installing switching capacity has already fallen rapidly in recent years. This has improved the expected profitability of such investment for entities such as cable companies. Currently, estimates of the cost of such installation are in the range of $200 to $300 per customer.

Telephone companies are also expected to install broadband capacity, which will permit them to provide video, as well as audio and data services. The additional cost of providing this service is currently estimated at $1,000 to $2,000 per installation.

A very important type of innovation will be those which permit the creation of a "seamless" network. Seamless, in this context, means that the passage of a single signal among service providers without the user noticing. Thus, each market participant will require less and less individual network capacity. For example, currently, if a cellular call is made by a cellular subscriber in one area from a location covered by another provider, the cost of renting the other companies facilities to transmit the call is currently the roaming charge. With a seamless cellular network, the signals are freely passed from one cellular provider to the next, who in agreement do not charge for this interconnection. The advanced deployment of SS-7 technology will make such seamless interconnection less expensive and of higher quality.

Another major market development will come from the paging industry. As the ability to transmit messages grows, the demand for its usage by the consumer segment of the market also grows. In fact, the consumer, versus business, usage of the paging market is the fastest growing component of the paging market. The length of the messages which can be transmitted using paging will increase substantially. Also, as paging companies become increasingly interrelated with the IXCs and the satellite companies, the geographic coverage of paging systems will grow tremendously.
Finally, an imminent technological and/or market development in the local exchange market is the "wireless local loop". The wireless local loop is essentially a stand-alone radio based local exchange. This wireless local loop is being implemented already in many less developed countries in the world which lack the existing wired infrastructure. The implementation of this technology in the country is further down the road than in those countries, in part because of the existence of the wired local loop. However, many more sparsely populated areas of the country will soon become candidates for such a network. This is likely to become more true as the regulatory authorities attempt to preserve the goal of universal service in the increasingly competitive environment.

All things considered, it is clear that these technological developments will continue to enhance the competitive environment in telecommunications. As additional ways of transmitting messages grows and improves in quality, whether voice or data, customers will seek the least cost, highest quality alternative to the existing system. Also, the tremendous growth in the capacity of the system, whether through direct investment or through capacity-enhancing technological developments, will surely mean that the cost of telecommunications will continue to decrease in the foreseeable future. Particularly for long distance telecommunications, the existing high degree of excess capacity and falling cost of very long distance transmission of messages bodes very well for the future affordability of telecommunications.\(^{11}\)

IX. THINKING ABOUT TAX POLICY

Having considered the current and emerging structure of the telecommunications market, it is time to think prospectively about the implications of these developments for the appropriate structure of sales or transactional taxation for the industry. There are eight issues which should be addressed when sculpting an appropriate tax structure.

A. DEFINING THE SERVICE

In the old days, a telecommunications service was easy to define. It was a phone call. However, it is now more difficult to identify exactly what constitutes a telecommunications service. Does the message need to be voice to be considered telecommunications? Do paging companies provide a telecommunications service, particularly when the messages can be as lengthy as currently anticipated? Regardless of how one feels about the appropriate definition of telecommunications, it is certainly the case that a voice message and a data message are alternatives which customers will consider. And, most importantly, decisions about taxation of one type of service versus another will influence consumers choice of the type of messaging they prefer.

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\(^{11}\)An excellent summary of these technological and market development, particularly as they relate to the cost of long distance service, can be found in "The Death of Distance", The Economist, September 30, 1995.
Are the CAPS currently providing a telecommunications service? They carry a message from a business to a long distance carrier. Does this constitute a taxable transaction?

Do the value-added networks constitute providers of telecommunications services. When a VAN coordinates a teleconference call, are the providing or enhancing a taxable telecommunications service?

In short, there are many examples of questions as to what constitutes a telecommunications transaction. A well thought out system of sales taxation will first come to a firm definition of a telecommunications service and one which will not need to be altered as technology advances.

B. INTERSTATE AND INTERNATIONAL CALLS

The fastest growing segment of the telecommunications market is the long distance market. It will continue to grow rapidly as the economic interdependence among regions and nations grows and as the price of long distance calling falls. Many states for years did not consider taxing long distance calls, owing to fears of violating the Commerce Clause. However, with the important Goldberg v. Sweet decision, which argued that taxation of interstate phone calls did not violate the Commerce Clause, states have been more aggressive at including the interstate calls in their tax base. Utah currently exempts long distance calls. It is perhaps time to rethink the rationale for this exemption.

C. ECONOMIC DEVELOPMENT IMPLICATIONS

One argument against the taxation of long distance is that such a tax would increase the cost of doing business in a state and could be a hindrance to economic development. Many firms are heavy users of long distance (through their customer service operations, reservations centers or direct marketing operations). The imposition of a tax on long distance may prove harmful to the competitive climate in the state.

A related issue with regard to the taxation of long distance is the taxation of 800 or WATS services. Some of the states which currently tax long distance services exempt 800-calls, specifically for economic development purposes.

D. SALE-FOR-RESALE

The principles of sales taxation require that the tax be placed only on final consumption, exempting the business use of an input. Without this exemption, the taxation at the business level would ultimately result in double taxation, once when the telecommunications service is purchased and again as it is reflected in the final price of the good.

It is an important question just how should a sales tax system deal with sales for resale. How do we account for telecommunications services which are business related, such as long
distance calls, those services provided by Internet Access Providers, on-line services, paging services, etc. On the one hand, they would appear that they should be exempt. On the other hand, the exemption will cause tremendous administrative difficulties in identifying exactly which transactions are business-related.

Some states have dealt with this problem by establishing a separate "transactions tax", independent of the general sales tax, which throws ALL transaction, business-related or not, into the tax base. Other states have kept all telecommunications transactions in the tax base by arguing that the telecommunications is indeed "consumed" by the producer and is, thus, not resold. In any case, the sales-for-resale problem must be addressed.

E. EQUITY CONSIDERATIONS

The incidence of a broadened telecommunications sales tax must be addressed. Broadening of the base may increase or decrease the progressivity of the overall sales tax. The issue is: To what extent should that consideration drive tax policy relating to the general sales tax. Although the broadening of the tax may be regressive (although there is no reason to think it necessarily will) there are other taxes which are more specifically designed to address questions of vertical equity, in particular, the income tax. Decisions relating to tax policy which consider the regressivity of the sales tax should address the income tax and other taxes simultaneously, to offset any potential undesirable vertical equity impacts of such taxation.

F. STATE AND LOCAL TAX POLICY INTERFACE

The general sales tax is not the only transactions tax placed on the telecommunications industry. Both phone companies and cable companies also pay gross receipts taxes to local governments. In some states, attempts are being made to assess a gross receipts tax on cellular and PCS companies. One implication of this tiered type of taxation is that effective transactions tax rates may be very high when the gross receipts and sales tax are considered together. A second consideration is the horizontal equity of the combined gross receipts and sales tax. When only some of the participants in the telecommunications sector are levied a gross receipts tax, then the leveling of the field with respect to the sales tax may be "unleveling" when all taxes are considered together. The issue, from the standpoint of general sales tax policy, is whether the existence of the gross receipts tax should even be a consideration when it comes to designing the most appropriate general sales tax.

G. REVENUE IMPLICATIONS

The telecommunications is one of the fastest growing sectors of the economy and is likely to stay that way for some time to come. As a result, the broadening of the sales tax base will not only yield significant revenues but it will also likely increase the elasticity of the tax and will also make the general sales tax more resilient (in terms of revenue yield) during economic downturns.
The issue here is not simply one of raising more revenue for state and local governments. Broadening of a tax base should not necessarily mean, nor be viewed as just more overall revenue. Should the decision be made to broaden the tax base, then it will become possible to reduce the overall general sales tax rate.

In this regard, it is important to keep in mind that the revenue yield of the general sales tax is already facing difficulties, in large part because of the telecommunications revolution. As use of 800 numbers and the Internet grows for the purposes of ordering tangible goods, greater shares of total purchases escape taxation. Mail order purchases are growing tremendously and, given several recent court rulings, are escaping any state sales taxation. The expansion of the sales tax base to include telecommunications services may, in the end, prove to be just an offset to this already eroding tax base.12

H. ADMINISTRATION

One of the most troublesome aspects of the technological and market developments in the telecommunications industry is the potential impact which it may have on the difficulty of administration of the tax. For the most part, the administrative difficulties arise from the attempt by the government to distinguish between one kind of service, or service provider, when in fact the services are functionally equivalent. Decisions will need to be made on the definition of a telecommunications service, with an eye toward their implications for administration. When one kind of telecommunications service is taxed and the other is not, although both kinds of services are provided by the same company, the task of administration (for the government) and compliance (for the business) rises. For example, consider the potential difficulties which arise, because cable services are not taxable in Utah under the general sales tax but telephone services are taxed. When a cable operator begins to provide telephone services and telephone companies begin to provide cable, the task of identifying which portion of a bill for both services is cable-related versus telephone-related will be difficult. What will a state do when a phone company offers cable service free of charge or at reduced rates (along with phone service) or a cable company offers phone service free or at reduced rates (along with existing cable service). The two should be treated equivalently.

Another problem arises because of Utah's exemption of interstate calls from sales taxation. Soon, telecommunications companies will begin to offer "one-price unlimited" service for long distance calling and the calling area will include many states. Some cellular companies already offer such a service. How will the flat rate bill be separated between taxable intrastate long distance and nontaxable interstate long distance?

There are a host of other administrative problems which will arise, such as those dealing with credit card calls, 900-calls, surcharges for calls from hotels, the sale of cards with fixed

nominal values of calls permitted, the tax treatment of access charges, roaming charges, interconnection fees, and on and on.\textsuperscript{13}

In short, these are all very important issues and they are also very difficult. With the understanding of the telecommunications market, its structure and its future, we can better reason our way to a logically consistent treatment of the sector.

\textsuperscript{13}900 service is not offered in Utah at this time.
APPENDIX A

SCHEMATIC DIAGRAMS OF TELECOMMUNICATIONS NETWORKS

The following schematic diagrams depict the structure of the telecommunications network and the changes to this basic system introduced by the new “players” in the market.

Figure 1 shows the “End Users”: households and businesses. In addition, it shows the “PBX”, which is a private business exchange, or a private internal switched network of common users. All calls are routed through the “Remote Terminal” to the “Central Office” (CO), where calls are switched. For calls within the group served by the same central officer’s switching equipment, this is all that is needed. If a call is placed to a location served by another CO, it is routed to that CO and, from there, to its final destination.

Long distance calls are sent, through the “Tandem” to the long distance company’s lines at its “Point of Presence (POP). At the calls destinations, the call is routed to the end users using the same network at that location.

Figure 2 illustrates how CAPs route long distance calls directly to the POP.

Figure 3 shows how the AEC ties large users and PBXs directly into the basic network and to the POP. AECs may ultimately build their own entire system, as in Figure 1.

Figure 4 shows how traditional cable companies receive signals from satellites and route them to subscribing end users.

Figure 5 illustrates the parallel system which cable companies may employ alongside the basic network. The “Cable Splitting Boxes” would separate voice from voice/video transmissions. The cable companies would have their own switching “Cable Switch”.

Figure 6 shows that natural gas companies may serve as an alternative long distance provider of signal transmission to and from the POP.

Figure 7 illustrates how, like a full-service cable company (Figure 5), electric companies may one day transmit and switch calls through their own network.
I. LOCAL EXCHANGE CARRIERS AND INTEREXCHANGE CARRIER
2. COMPETITIVE ACCESS PROVIDER
3. ALTERNATIVE EXCHANGE CARRIER
4. CABLE TRADITIONAL
5. CABLE - TELEPHONY
6. NATURAL GAS COMPANIES
7. ELECTRIC COMPANIES
Sales Taxation of Telecommunications Services in the State of Utah

**Publisher(s):** Fiscal Research Center of the Andrew Young School of Policy Studies  
**Author(s):** Richard McHugh  
**Date Published:** 1997-02-01  
**Rights:** Copyright 1997 Fiscal Research Center of the Andrew Young School of Policy Studies  
**Subject(s):** Journalism and Media