INNOVATION AND PRIVATIZATION
IN THE TELECOMMUNICATIONS INDUSTRY

by

Jane L. Dyer

B.A., Wayne State University, 1984

SUBMITTED TO THE ALFRED P. SLOAN SCHOOL OF MANAGEMENT
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 2000

© Jane Dyer 2000. All rights reserved.

The author hereby grants to MIT permission to reproduce and to distribute
publicly paper and electronic copies of this thesis document in whole or in part.

Signature of Author: __________________________________________
Alfred P. Sloan School of Management
May 5, 2000

Certified by: ___________________________________________________
Lester C. Thurow
Thesis Advisor

Accepted by: ___________________________________________________
Toby W. Woll
Director, Sloan Fellows Program
INNOVATION AND PRIVATIZATION
IN THE TELECOMMUNICATIONS INDUSTRY

by

JANE DYER

Submitted to the Sloan School of Management on May 5, 2000 in Partial Fulfillment of the Requirement for the Degree of Masters of Business Administration

ABSTRACT

The worldwide liberalization of the telecommunications industry has accelerated due to an explosion of technological innovation, growing consumer sophistication, and increasing competition. The process of privatizing state owned telecommunications corporations in Europe and other areas of the world is comparable to the deregulation of the telecommunications industry in the United States. This thesis explores the link between innovation and privatization in the telecommunications industry.

In addition to providing an analysis of how innovation and privatization are connected in the telecommunications industry, the thesis also examines the structure, market trends, technology strategy, and globalization of the industry. Finally, it contrasts the management of innovation and deregulation of two incumbent telecommunications companies, Deutsche Telekom and Bell Atlantic.

Thesis Supervisor: Lester C. Thurow
Title: Professor of Management and Economics
Dean Emeritus
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION</strong> .................................................................................. 5</td>
</tr>
<tr>
<td><strong>WHY PRIVATIZATION?</strong> ........................................................................... 6</td>
</tr>
<tr>
<td><strong>INDUSTRY OVERVIEW</strong> ............................................................................ 9</td>
</tr>
<tr>
<td><strong>INDUSTRY STRUCTURE</strong> .......................................................................... 12</td>
</tr>
<tr>
<td>Local ......................................................................................................... 14</td>
</tr>
<tr>
<td>Mobile ......................................................................................................... 16</td>
</tr>
<tr>
<td>Long Distance ........................................................................................... 18</td>
</tr>
<tr>
<td>Equipment ................................................................................................. 19</td>
</tr>
<tr>
<td>Data Communications .................................................................................. 21</td>
</tr>
<tr>
<td>Internet Service Providers ........................................................................ 24</td>
</tr>
<tr>
<td><strong>MARKET TRENDS</strong> .................................................................................. 24</td>
</tr>
<tr>
<td>Convergence .............................................................................................. 24</td>
</tr>
<tr>
<td>Consolidation ............................................................................................. 27</td>
</tr>
<tr>
<td>Globalization ............................................................................................. 28</td>
</tr>
<tr>
<td><strong>AT&amp;T'S MISSION AND STRATEGY</strong> .......................................................... 29</td>
</tr>
<tr>
<td>Strategic Changes ...................................................................................... 29</td>
</tr>
<tr>
<td>Acquisitions and Joint Ventures .............................................................. 31</td>
</tr>
<tr>
<td>Sustainability ............................................................................................. 33</td>
</tr>
<tr>
<td>Appropriability ........................................................................................... 33</td>
</tr>
<tr>
<td>Opportunism and Timing. ........................................................................... 34</td>
</tr>
<tr>
<td><strong>TELECOMMUNICATIONS REGULATION IN THE UNITED STATES</strong> .............. 34</td>
</tr>
<tr>
<td>Universal Service ....................................................................................... 36</td>
</tr>
<tr>
<td>Deregulation ............................................................................................... 37</td>
</tr>
<tr>
<td><strong>A CLOSER LOOK AT TWO INCUMBENTS</strong> ................................................ 39</td>
</tr>
<tr>
<td>Deutsche Telekom ..................................................................................... 39</td>
</tr>
<tr>
<td>Bell Atlantic ............................................................................................... 49</td>
</tr>
<tr>
<td><strong>INNOVATION IN THE TELECOMMUNICATIONS INDUSTRY</strong> .................... 53</td>
</tr>
<tr>
<td>Regulation ................................................................................................. 54</td>
</tr>
<tr>
<td>Brand .......................................................................................................... 54</td>
</tr>
<tr>
<td>Service ....................................................................................................... 55</td>
</tr>
<tr>
<td><strong>IMPLICATIONS FOR PRIVATIZING INCUMBENTS</strong> .................................... 55</td>
</tr>
<tr>
<td>Cultural Change ......................................................................................... 56</td>
</tr>
<tr>
<td>Regulatory Management ............................................................................ 56</td>
</tr>
<tr>
<td>Management of Innovation ....................................................................... 57</td>
</tr>
<tr>
<td><strong>CONCLUSIONS</strong> .................................................................................... 57</td>
</tr>
<tr>
<td><strong>BIBLIOGRAPHY</strong> .................................................................................... 62</td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENTS

To Lester Thurow, for sharing his knowledge and experience to make this thesis a more complete work.

To Hagen Hultsch, Deutsche Telekom, Bill Cullen, Bell Atlantic, and Jeff Lanning, FCC, for sharing their vast industry, regulatory, and corporate knowledge and insight. Thank you for your candor.

To Bob Reisner, US Postal Service, and Cathy Rogerson, Price Waterhouse Coopers, for fueling my interest in innovation and privatization.

Finally, to George Hurst, my husband, and John Hurst, my son, for their constant support and love. You are my true north.
Innovation and Privatization in the Telecommunications Industry

Introduction
This paper explores the link between innovation and privatization in the telecommunications industry. The process of privatizing state owned telecoms in Europe and other areas of the world is comparable to the deregulation of the telecommunications industry in the United States. Because of the accelerated pace of innovation that has, in turn, increased the speed with which telecom deregulation and privatization are occurring worldwide, the role of regulation should ultimately be limited to spectrum management, consumer protection, and the coordination of international standards and open markets. Regulators need to enforce antitrust policies but they should not be involved in market entry and pricing decisions. Innovation has outstripped the need for regulation designed to promote competition.

Nowhere is privatization more active and more dynamic than in the area of telecommunications. In the past few years, privatization in this sector has increased, with more than 20 countries selling stakes totaling over $140 billion. A combination of technological advances, aggressive actions by potential competitors, growing consumer sophistication and an increasingly open
regulatory environment has created a changing marketplace for incumbents and new entrants.

In addition to providing an analysis of how innovation and privatization are linked in the United States telecommunications industry, this paper will examine the structure, market trends, technology strategy, and globalization of the industry. This paper will also look at two incumbent telecom companies to contrast the management of innovation and deregulation at the corporate level:

1. Bell Atlantic, a US telecom in a relatively advanced state of deregulation, and
2. Deutsche Telekom, a German telecom that is in the beginning stages of privatization.

Why Privatization?

Increased privatization in the telecom sector is being pushed by a variety of drivers. Once viewed as a natural monopoly, technology innovation has dramatically changed the game for telecommunications players. Many governments still require universal access, primarily for political reasons, creating the need for industry regulation. If society requires that telephone service be available to every household at standard low prices, some government regulation is necessary to ensure that these universal services are provided. However, the cost structure of telephone service has been completely altered through innovation. For example, excess long-distance capacity created by technological advances and increased competition has made this a low margin business and
has reduced the potential for cross-subsidies. Customer data management can completely change the game for full service providers that successfully merge customer data, including billing, network operations, and customer service calls, to create profiles of customers leading to customized pricing schemes and service offerings. In addition, cable and wireless companies are introducing new competition for local service previously dominated by incumbent telecoms that originally laid the copper wire infrastructure that provided, until recently, an exclusive gateway to the “last mile” into homes.

For developing countries, privatization can provide the means to expand and improve telecom infrastructure, in many instances well beyond the scope of state budgets. These countries may also need to raise the level of service to minimally acceptable standards. In addition, extending service to the majority of residents through privatization can help attract foreign direct investment from consumer goods companies and other industries. Some governments also seek to use the capital raised from privatizing state owned telecoms to fund other federal expenses or service external debt.

Countries that are more developed may seek the positive effects of competition in order to speed the modernization of the network to provide more efficient infrastructure for Internet commerce, spur innovation, elevate service to world class levels, and lower prices to businesses and consumers. A robust telecommunications infrastructure is a basic requirement for companies needing
customer service call centers, information processing, financial services, and competitive supply chain management.

Governments typically maintain broad controls over this sector since it represents vital national security and economic interests. Social issue management such as universal service and consumer protection, spectrum management, and standards development continue to remain under the control of the state. If the government is also involved in further regulation of the industry, including market entry and pricing regulatory controls, it is tricky at best to ensure a minimal level of political independence. Government regulatory bodies need freedom from conflicts of interest, clear jurisdiction, dispute resolution, and adequate organizational competence and funding, particularly in the midst of an explosion of technological advances. A chasm exists between the pace of technological advancement of this industry and its regulators. These issues will be explored further in a later section covering the US regulator, the Federal Communications Commission (FCC).

The rate at which market liberalization proceeds in less developed countries involves a trade-off in either high service standards and lowered prices, in the case of rapid privatization, or broader access if fewer new entrants are allowed into the market. Universal service obligations can be achieved through the higher margins earned via monopoly or duopoly rents in order to finance expansion in infrastructure.
Communications in its most tangible forms of voice, video and data, is a crucial ingredient in the management and dissemination of information. Information, in turn, underpins intellectual capital, directly affecting economic growth. The value of labor is inextricably linked to the exploitation of the telecommunications infrastructure and the transmission of information. Deregulation of this industry has accelerated world wide, due to the promise of economic rewards and the benefits of wide spread access to information leading to a better educated work force, afforded by a strong telecommunications system.

Industry Overview

Historically, the telecom industry constituted a natural monopoly, justifying a single, vertically integrated service provider for the vast majority of business and residential users. Regulation explicitly protected monopolies, exchanging competitive limitations for universal service. Rapid change in the industry, both on the demand and supply side, began to undermine this regulatory model for certain products and customer segments in the 1960s. In subsequent years, innovation affected additional customer and product segments, driving further deregulation that continues today. The legacy of this rapid change, fueled by innovation, and accompanying deregulation includes massive value creation, new and better services at lower costs, and substantial industry restructuring.
The global telecom market is over $850 billion strong in revenue, growing at 10 percent per year, powered by approximately 5,000 multinational companies generating over $100 billion in communications revenue.

AT&T was at the center of deregulation in the United States and was broken up in 1984 as a result of an antitrust suit began in 1974, after a 70 year run as a monopoly. Seven baby bells took over local service while AT&T was left with long distance and Western Electric, the precursor to Lucent.

Today, there is an explosion of growth in the telecommunications industry, driven by the Internet and the growth of wireless calling. This industry is becoming an increasingly important driver of value growth for the US economy, led by more than 350 public telecom companies. Since 1979, telecom industry revenues had grown from 2.5 percent of the US Gross Domestic Product (GDP) to 5.7 percent of GDP in 1997. Nearly $2 trillion in market capitalization has been created by the US telecom industry since 1979. In addition, during the same time period, the rate of growth in the industry has far out-performed the US economy as a whole.

When AT&T still held its monopoly in 1979, there were essentially two major lines of business, local and long distance calling. AT&T also had traditional equipment and video businesses prior to its break-up. By 1998, innovation led to the
creation of mobile, Internet Service Providers (ISPs), data network equipment and services, and functional services businesses, such as call centers.

Even more remarkable, over 50 percent of the US telecommunications industry's value has been created by companies that were never part of AT&T. Out of over $1 trillion in market capitalization created between 1988 and 1998, local and equipment product sectors each accounted for a third of the value creation, while long distance accounted for about 22 percent, with wireless at 13 percent.
According to Jeff Lanning from the FCC, “It was believed in 1984 that local service still constituted a natural monopoly”, so although long distance was liberalized, the Regional Bell Operating Companies (RBOCs) retained monopoly status. Interestingly, today not much has changed in terms of the core businesses of both the RBOCs and long distance carriers. Incumbent local exchange carriers have a 96 percent share in the local exchange market and derive 70 percent of their revenue from local exchange access services, while the long distance carriers own 92 percent of the long distance market. This key revenue stream represents 76 percent of the long distance carriers’ total revenue.

And though major sources of revenue remain tied to their historical core positions in the marketplace, the RBOCs and long distance carriers are players in the cellular market and have enjoyed a high level of growth in this sector. AT&T’s minority sell off of their wireless unit, raising over $10 billion, will help finance its strategy to become the national telecom gateway to the household.

Industry Structure
In the United States, the telecommunications industry is structured primarily by line of businesses due to the 1984 AT&T divestiture decree by the Department of Justice. Local services are still highly regulated, while the early separation of long distance and equipment markets led to today’s highly competitive structure in these sectors. While this line-of-business view of the industry is still applicable
today, the lines are becoming increasingly blurred as telecommunications institutions are becoming much more complex as they adopt an exploding array of new technologies and services. Cable television companies, cellular providers, local exchange carriers, long distance, satellite, equipment, and software companies are all participating in the new telecom marketplace. Even oil and utilities firms are in the game, using existing infrastructure to provide a conduit for new fiber optics networks.

In contrast, Germany is just beginning the deregulatory process and the government has chosen not to break-up the incumbent, Deutsche Telekom, but to allow for full competition in all lines of business. By allowing Deutsche Telekom to remain intact, the German government runs the risk of merely exchanging a publicly owned monopoly for a privately owned monopoly, unless it aggressively moves to ensure competition, including speeding the sale of its cable business.

However, the potential for a completely liberalized marketplace in Germany and the rest of Europe is entirely feasible, as demonstrated by the United Kingdom. British Telecom is a good example of a European telecom that has successfully made the transition from state owned monopoly to a highly competitive private enterprise. Britain's telecom monopoly, which existed until 1984, has now been replaced by a completely liberalized market of over 150 telecom players.
Here is a brief description of the major telecom businesses in the United States:

**Local**

In 1998, total local exchange services revenues were approximately $130 billion with approximately 40 percent of revenue coming from basic dial tone charges. Another 20 percent came from switched access fees paid by long distance carriers for originating or terminating calls. Value-added services, such as call forwarding, caller ID, and directory assistance, accounted for about 10 percent of the revenue. The balance of revenue (about 30 percent) was from payphones, private lines, directory fees, and special access fees.

There are three primary customer segments for local service: carriers, business, and residential. Business and residential customers each account for about 40 percent of revenue and carriers contribute about 20 percent. Business customers are generally cheaper to serve and revenues are highly concentrated among the largest business customers. As a result, several implications arise for incumbent players:

1. Business customers subsidize residential customers via rates set by regulators to create an implicit subsidy.

2. Urban customers subsidize rural customers. Tariffs set by regulators incorporate an average cost across all line density areas, in support of explicit
universal service, even though the cost of local service is much higher in rural low line density areas.

3. Heavy long distance users generate high access revenues used to subsidize light long distance users.

4. Profitable customers are highly concentrated making local exchange carriers extremely vulnerable to cherry picking by attackers. Because incumbents are not allowed to de-average their prices, as the FCC requires implicit subsidies, new entrants can pick off high revenue, low cost customers even if the new entrants are more inefficient than the incumbent.

5. As incumbents enter the long distance market, as Bell Atlantic is doing in the New York market, revenue concentration in the heaviest users will intensify.

It should be noted that since their appearance in 1992, new competitors, competitive local exchange companies (CLECs), entering the local market, have only captured about 4 percent market share from incumbents and have not yet made a return in earnings, although total market capitalization is over $60 billion. The high market capitalization appears to stem from a market expectation that CLECs are ripe for acquisition. The low rate of competition in the local market has been influenced by unattractive residential customer rates set by the FCC, although there is still growth in the market due to corporate demand for new data lines.
Mobile

From 1984 to 1995, a government created duopoly consisting of one RBOC and one independent wireless operator existed in each regional market. This regulatory protection resulted in high earnings but low innovation. By 1990, mobile telephony market capitalization was already at approximately $80 billion growing to $170 billion by 1998. The increase in market cap from 1990 to 1998 in cellular was less than a third of the gain of the Standard and Poor 500, illustrating the relative maturity of the industry in the US.

Similar service offerings and pricing were the norm in each region due to its duoploy structure, up until 1995. This changed when the FCC began selling more of the wireless spectrum in 1994 via auctions, enabling new entrants to join the market. Wireless incumbents, such as AT&T, AirTouch, and Bell Atlantic NYNEX Mobile also purchased additional spectrum, and became entrants in new regions. In addition, new digital technology is much more efficient than analog, allowing more customers to fit into a given spectrum block. This increased capacity due to technology and increased spectrum is outpacing demand and will result in inevitable lower prices. The implications for the mobile industry include increased customer usage, customer churn, and a drop in profitability.

Although this industry is maturing, the growth opportunity is still enormous: by 2004, wireless telephones will account for nearly half of all voice minutes in the US. New personal communications services (PCS) converging data and voice
will also stimulate growth in this sector. Current market penetration of wireless in the US is about 30 percent and consists of mainly business subscribers, in all about 70 million customers. Morgan Stanley projects wireless penetration to grow to about 53 percent by 2006. The FCC’s auctioning of additional radio spectrum and the introduction of other communications services are driving increased competition, which will be discussed in more detail in a later section.

Standards development has been crucial to the growth of the mobile sector. Europe's Global Systems for Mobile (GSM) standard has emerged as the world's leading digital cellular technology. It has found more than 100 operators in 70 countries throughout the Asia Pacific region and Africa as well as Europe. GSM is projected to capture approximately 60 percent of the global market this year, with 20 percent for Japan’s Personal Digital Cellular Standard and a total of 15 percent for the US's two contending systems, Code Division Multiple Access (CDMA) and Time Division Multiple Access (TDMA). The deep penetration of existing analog technology into the American mobile market, coupled with the inability of industry to agree on one national standard, has led to a slower migration to digital technology, although mobile operators are busy upgrading their networks to migrate subscribers to digital.

The new Bluetooth wireless networking technology developed by Ericsson, promises a worldwide standard for short range wireless networking allowing information sharing between personal digital assistants, such as Palm Pilots,
laptops, and cell phones. This free and open protocol will lead to shipment of more than 1.7 billion Bluetooth devices per year by 2005, creating a new $3.4 billion market, according to Merrill Lynch. And the next generation of wireless networks, known as G3, which will make new bandwidth-intensive services such as real-time video possible, are being deployed in Japan and Europe. American carriers, alternately, are deploying transitional technologies such as GPRS and EDGE, which are powerful enough for most services and much cheaper than G3.

Long distance

The market has valued the long distance sector at over $270 billion, mainly reflecting the high performance of MCI Worldcom and Qwest Communications, even though AT&T continues to dominate the long distance market in revenue. Regulatory changes in access charges have lowered costs to the long distance players, falling by more than 70 percent since 1984.

Fierce competition in this sector has pushed down prices and over-capacity may drive prices down even further. Growth has continued in long distance driven primarily by growth in conversation minutes and increased number of lines. Technology will likely cause long distance to evolve from a domestic industry with an international product segment into a global industry, resulting in lower profitability from international telephony. In addition, once the investment in infrastructure is made, pricing complexity can be reduced. For example, for heavy long distance and international users, monthly flat rates for unlimited
calling, similar to AT&T's cellular One Rate, is a natural consequence of healthy competition in this sector.

Although Internet telephony quality has not yet been perfected for consumers, it is a viable low cost long distance alternative for office networks of multinationals. Today most offices have two communications networks, one for voice and one for data. On March 27, 2000, Cisco announced an office telephone system based on Internet technology, which uses a common network. This has serious implications for the future profitability of the long distance providers. Long distance's evolution into a low margin commodity has provided the impetus for AT&T's strategic gamble on cable to allow it an entrance into the residential data communications market.

**Equipment**

This $250 billion industry has been the major driver of innovation in the telecommunications industry, providing the means for ecommerce to flourish over the Internet. Manufacturers of data networking equipment have dominated growth in market capitalization among telecom equipment providers, accounting for almost half of the value created in the industry on about 20 percent of the revenue. The market trends to develop new business models for Internet protocol (IP) applications, such as fax and voice over IP, virtual private networks, and multimedia conferencing, will drive telecom revenue growth and in turn, equipment manufacturer growth.
Telecom and data-networking equipment is produced for the end user's site, the "premise" in industry-speak, the "core network" which consists of the public switched telephone network and the Internet, and the "edge", which is the industry's term for the portion of the network that connects the premise to the core. Leading telecom equipment manufacturers include Lucent (which was recently spun off from AT&T and has had at times, a higher market valuation than its former parent), Ericsson, Nokia, Motorola, Alcatel, Nortel, Tellabs, and Ciena. Data-networking is dominated by Cisco, which accounts for 70 percent share and over 90 percent of the total market cap in this category. Other data-networking firms include Ascend, 3Com, and Newbridge Networks.

Manufacturing products can be looked at in two broad categories:

1. Telecom products such as private branch exchange (PBX) infrastructure, voicemail adjuncts, and telephone handsets; access products (T1, ISDN); multiplexers and digital cross-connects, and;

2. Data-networking products, including local area network (LAN) and wide area network (WAN) routers and switches, frame relays, and remote access servers.

The equipment manufacturers are beginning to converge, as there have already been mergers of traditional telecom equipment manufacturers with new data
networking manufacturers, emulating the technological convergence of voice and data.

**Data Communications**

Data communications involves the distribution and exchange of data messages between machines that process data. Although datacom represents only about 10 percent of telecom service revenues in the US, it is growing three times as fast as voice revenues. In 1996, $20 billion in revenue came from datacom services, with about 70 percent generated by large businesses. The drivers of growth include inter- and intracompany transactions and communications, and the Internet explosion. Internet data traffic has been forecast to grow up to as much as 300 percent per year. Innovation in data communications has been prolific and a race to increase bandwidth to businesses and residents is being waged by a variety of players:

- Incumbent telcos are increasing bandwidth through integrated services digital network (ISDN) and asymmetric digital subscriber line (ADSL) technologies via existing copper wires.
- Low earth orbit satellite consortiums, such as Globalstar, are building a distributed datacom network in space to sell capacity to local carriers worldwide.
Companies such as AT&T, MCI/Worldcom, Sprint, Qwest, Williams, Level 3, and Frontier have invested in a huge amount of backbone capacity and bandwidth through fiber deployment.

- Cable access also promises high bandwidth, and
- Fixed wireless through microwave technology offers an additional option for data access.

The increase in backbone capacity is expected to handle even the most aggressive forecasts of Internet datacom growth. Technology is driving exponential capacity gains on existing fiber, increasing bandwidth by as much as 100 times. The market for data transmission is driving expansion with huge investments in local and long distance facilities and software by telecoms. New entrants actually have an advantage over incumbents as they are laying cheaper, faster pipelines to meet potential customers' expected needs for increased volume and speed.

In addition, IP telephony and fax are emerging as opportunities for increased competition in the domestic and international long distance market. Computing, data networks and voice networks are converging, giving new opportunities for growth to both traditional service provider telcos and non-telcos, such as Microsoft and Cisco, providing entrees into new businesses for all players. This mix of new service offerings, new players, and new technology has significant
implications for the future of the FCC and other regulators and what role they should play in this integrated world.

From strictly a cost viewpoint, a company with a monopoly, such as AT&T pre-1984, probably could have been able to invest in increased bandwidth via fiber optics to homes and businesses at a much lower cost than the myriad of competitors are doing so in aggregate. However, competition is providing the impetus for the “tracks” to be laid at a much faster rate and ultimately will provide data communications to consumers and businesses at lower prices than a monopoly provider. The social cost of competition versus a monopoly structure boils down to a debate regarding universal access. In a knowledge economy, Internet access for citizens is becoming an important political and economic issue throughout the world. In a competitive market, bandwidth will be provided first to high-income households who can pay the relatively higher monthly access charges early adapters typically pay for any new technology. Prices will come down as more homes are connected with increased competition.

Fortunately, Congress and the regulators have not extended telecommunication common carrier regulation to information services such as wireless, e-mail and Internet access. In John McCain’s letter to the FCC Chairman, he wrote that such regulation “...would be disastrous to the growth and development of services that have flourished over the last two decades in no small measure because they were not freighted with tariffing, resale and other obligations imposed on
common carriers.” Because it appears that universal service for datacom and the Internet will not be regulated in the United States, arbitrage opportunities are an inevitability, where datacom providers can cherry pick traditional telecommunications customers, whose costs have been artificially inflated by universal service and access charge levies. This argues for swift deregulation of the telecom industry where the FCC stays completely out of pricing and market entry, since convergence of data and voice will make universal service obligations untenable from a regulatory standpoint. If citizens desire universal Internet access at libraries and local schools, the best route is explicit direct tax subsidies to pay for it rather than transfer pricing.

Internet Service Providers

Many major telecommunications service providers offer a range of services that compete with traditional Internet Service Providers such as AOL, including MCI/Worldcom, GTE, AT&T, Sprint and the local exchange carriers. While revenues are less than $2 billion for telcos in this category, the contribution to market capitalization has been estimated at more than $7 billion.

Market Trends

Convergence

The major trend in the telecommunications industry can be summarized in one word: convergence. Convergence will take place along five fronts:
1. Content and delivery
2. Voice and data transmission
3. Fixed and mobile telephony
4. Mobile and data
5. Globalization

The convergence of computing, data networks, and voice networks, in addition to the deployment of increased bandwidth will be extremely beneficial to customers, primarily in the form of reduced prices for all telephony services. The highly competitive environment also promises innovative new services, including high speed Internet access as well as bundled service offerings of telephony, cellular, Internet access and cable.

Mobile data convergence promises a huge new market attracting leaders in a variety of industries:

- Cellular handsets - Nokia
- Internet portals – AOL, Yahoo
- Consumer electronic companies - Sony
- Manufacturers - Intel and Cisco, and
- Brand marketers – Virgin
These companies and other industry members seek a share of the "Mobile Net" bonanza in addition to the traditional telcos. This market trend will fuel joint ventures and mergers and acquisitions in the European market first, where mobile service already has high penetration.

Data and Internet-related revenues are expected to grow at 30 percent per year over the next several years with consumer access lines projected to grow at about 3 percent per year, while business access lines are forecasted to grow at approximately 5 percent per year.

Competition will become much more intense as AT&T rolls out its cable telephony to provide a full range of services and RBOCs expand long distance services, while CLECs will continue to take share.
Consolidation

Consolidation in the telecommunications industry is driven by three trends:

1. Scale seeking volume
2. Reach seeking access
3. Bandwidth seeking content

In fact, because data networks will drive market value in the telecommunications industry, some suggest that there will no longer be charges for voice traffic in the near future. Voice will simply become a value-added service that rides on top of Internet protocol networks. This will create an interesting landscape for future competition: companies may begin to offer voice for free via data networks. Companies such as MCI Worldcom and Qwest are well positioned to capitalize on this convergence since they have built huge, global, high-speed data networks targeted to the highest value business customers.

In the next five to ten years, wireless penetration will expand and will begin to substitute wireline voice. Voice recognition is the key to wireless Internet usage (since fingers cannot be miniaturized to fit tiny keyboards) and should be perfected in the next 3 to 5 years, further stimulating growth of the wireless sector.

Consolidation is already occurring in the industry, as the recent Vodafone/Mannesmann merger illustrates. Convergence of data and voice, local
and long distance service will likely lead to five mega-telecommunications
carriers in the US that will provide access to customers via huge backbone,
global networks that can provide the full range of bundled services to customers.

Globalization

Americans and Europeans share a common economic imperative: traditional
telecom markets are saturated, and there is little growth in the number of
domestic consumers. Population growth in the US is about 1 percent per year,
while in Europe the rate is even lower. In this environment, growth in demand of
telecom products and services will be driven by growth in new services that
replace old ones and growth in consumer markets. The most expedient method
to ensure innovative new services at a fast rate and to also seek new markets is
the merger/acquisition route.

In addition, the needs of multinational corporations for international Internet
networks is causing firms such as AT&T, British Telecom, KPN and Qwest, Viatel
and others to invest millions to create these networks. The ability to offer end to
end services to multinational customers between the world’s cities on a single,
wholly owned network will be a key source of competitive advantage for the
telecoms playing in this arena.

To illustrate the affect new innovation and convergence has had on one industry
player, let’s take a closer look at AT&T’s strategy. CEO Michael Armstrong
wants to move AT&T from its current position as a long distance commodity provider, a sure recipe for stagnation, to a full service, global telecom. This goal is certainly not unique among worldwide telecommunications companies in the search for continued growth.

**AT&T’s Mission and Strategy**

Armstrong’s vision is to transform the company from a long distance company to an “any distance” company; from one that handles mainly voice calls to a company that connects its customers to information in any form: voice, data, and video; and finally from a domestic company to a global company.

**Strategic Changes**

This mission is being supported by a series of strategic shifts within the company:

*Resale to Facilities-based*

Armstrong wants to move from reselling the connections of other companies to full control of the architecture to ensure quality of service and cost control.

*Narrowband to Broadband*

While AT&T’s long distance network has been broadband for years, the final connections to most customers are still pairs of copper wires that carry a narrow stream of information, which is fine for voice but inadequate for data.
Circuits to Packets

In the old technology of voice telephony, every call ties up a circuit or pathway through the network from one phone to the other. With the new technology standard known as Internet protocol (IP), information, sound or data is broken into separate units called “packets” that are reassembled at the receiving end. The IP standard is allowing new applications such as Internet services delivered over pocket-size wireless phones.

Local Cellular to Digital Wireless Leader

The growth of wireless calling is second only to the Internet as the basis of overall growth in the telecommunications industry. AT&T recently announced its “One Rate” service for wireless, which offers customers a single rate for wireless calls nationally, as it continues to expand its digital wireless network, which currently covers 75 percent of the nation. It is worth noting that AT&T invented cellular service while still a monopoly, but at the time, management believed it had no future. The fear of cannibalizing its wireline services was likely the primary reason it failed to capitalize on its invention, as it had so much invested in copper wires in the ground. Today, it is one of AT&T’s fastest growing businesses but in a highly competitive market where it clearly lost out on a first mover advantage.
Domestic to Global

AT&T has a facilities based global strategy to provide multinational customers with end-to-end global services with consistent quality, price, and customer support.

Acquisitions and Joint Ventures

The company has supported the above strategies with a series of bold acquisitions and joint ventures. Given that the baby bells have already locked up the local phone lines into American homes, further bolstered by the 1996 Telecom Act, AT&T is heavily investing in cable companies to also gain access, in order to provide total customer solutions and potential system lock-in via loyal, satisfied customers. It invested $48 billion in Tele-Communications (TCI) which provides access to 17 million potential customers. The company also purchased the MediaOne Group for $58 billion, which reaches an additional 8 million customers. With the cable companies it owns, AT&T will reach about 22 percent of the nation. Coupled with its joint venture with Time Warner, the company claims it can reach a potential 40 percent of American homes. Further, AT&T is strengthening its gateway strategy to the American home by entering the fixed wireless business which will connect cellular phone towers to rooftop antennas connected to the telephone wiring of homes and businesses.

In addition to the acquisitions, AT&T must also lay the technical “tracks” into these homes by upgrading the cable lines, to effectively provide two-way traffic demanded by phone calls, the Internet, and interactive television. The capital
investment in this strategy is staggering, over $110 billion. In addition to the enormous amount of cash required for acquisitions and infrastructure, millions have been invested to hire and retrain employees in order to provide quality service and sell the new cable phone service.

The company is also investing in the cellular business through its acquisition of Vanguard Cellular Systems to expand coverage in the Eastern US, gaining 700,000 cellular customers. It also recently entered into a joint venture with British Telecom and acquired the IBM global network to link 100 of the world's economic centers in support of its global strategy.

The chart below depicts the tremendous transformation involved from being a long distance service provider to a company that will provide voice, data, local, long distance, and wireless phone service.

![Chart showing transformation from 1998 to 2004](chart.png)

*Source: AT&T Corp., WSJ, 11/5/99*
Consumer and business long distance, accounting for 73 percent of the revenue mix in 1998, is expected to shrink to 30 percent of the mix by 2004. In contrast, business data and local phone service will grow from 14 percent of the revenue mix in 1998 to 33 percent by 2004.

Sustainability
The biggest enemy to the strategy, in Armstrong’s words, “is time and scale”. The market has doubts about the strategy currently, reflected in its stock price. However, if AT&T can execute by getting the infrastructure laid, service quality up, and an effective sales force to sign up cable customers, AT&T will be a potential dominant force in the industry. Its position into the American home can be secured only if it enjoys first mover advantage in the majority of US markets, as switching costs are expected to be high. And even if consumers completely abandon wire for wireless, AT&T is hedging its bets on cable through investment in fixed wireless.

 Appropriability
The strategy to be the gateway to the home for voice, video and data is certainly not unique. The baby bells are also implementing similar strategies although none have the brand nor national reach and deep pockets of AT&T. One of AT&T’s challenges and a potential source of slack, is that if it is successful, it may face additional rounds of regulatory battle. It should expect a raft of competitors to band together to fight its potential dominance.
Opportunism and Timing

One of the biggest risks of the AT&T strategy is if the enormous investments required to shift from best product in long distance to the total customer solutions position does not produce sufficient value or if it cannot be extracted soon enough to payoff investments.

Even though the market has devalued AT&T's stock by more than $50 billion in market capitalization in response to Armstrong’s strategy, his gamble has the potential to reap enormous rewards for shareholders in the long term. The transformation of AT&T is vital if it is to stay in business and bold action is required to extract the tremendous value promised by the growth of the Internet and wireless technology. The alternative, which is to continue as the leading long distance provider is not an option if AT&T is to thrive in this time of sweeping change in the telecom industry.

Telecommunication Regulation in the United States

Regulation of the telecommunications industry in the US is primarily the responsibility of the Federal Communications Commission (FCC) and individual state regulatory bodies. The FCC’s primary role is to ensure fair competition, consumer protection, and to manage the spectrum. The 1984 divestiture of AT&T imposed a structural separation of AT&T's competitive businesses from the regional bell operating companies (RBOCs) who were believed to own a natural monopoly by virtue of their possession of the “last mile” copper wire infrastructure, leading from “bottleneck” facilities into homes and businesses. It
should be noted that no European or Asian country has adopted structural separation as the means of regulating nondiscriminatory access to bottleneck facilities.

The vertically integrated AT&T monopoly had a dismal record of innovation prior to its break-up. In telephone equipment, the company gave consumers a choice similar to Ford Motor Company at the dawn of the automotive industry, you could get a telephone in any color you wanted, as long as it was black. By the 1970s, terminal equipment was opened for competition, and with it came consumer choice and increasing innovation.

The FCC was created in 1934 when Congress declared a state of spectrum scarcity and nationalized all the airwaves. Much of the FCC’s work up until the AT&T divestiture had the effect of protecting monopoly and promoting scarcity. For the last 25 years the FCC has generally promoted a very slow transition to competition. Prompted by the courts, which upheld the rights of new innovative competitors to AT&T, the FCC concluded in the 1970s that competition in all interstate service markets and terminal equipment was in the public interest. The single most vital development in the movement toward deregulation was a lawsuit filed by MCI in 1974 leading to the break-up of AT&T in 1984.
Universal Service

There has been a metamorphosis of the meaning of universal service with regard to telecommunications in the United States. The phrase was invented by AT&T in 1907 as a justification for an integrated, regulated monopoly. AT&T's slogan was "one system, one policy, universal service" and bore the system of regulated monopoly. Eventually, universal service meant high telephone penetration. Today, this policy goal largely has been achieved in the US, as about 95 percent of households have telephones (and where they do not, phone cards are widely available for public telephone usage.)

Universal service as a policy goal is traced to the Communications Act of 1934 whose stated purpose is "to make available, as far as possible, to all the people of the United States, a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges." Universal service policy at this time made sense since in the wake of the Great Depression, penetration had plummeted to just over 30 percent of households.

However, today, universal service has come to mean cheap basic telephone service for all residential consumers. Cheap rates in high cost residential markets are supported by implicit cross subsidies in the structure of regulated prices. The 1996 Telecom Act's goal is to bring the benefits of competition to "all Americans" while providing for uniform telephone rates. There are some that
argue that pricing regulation is an inevitable consequence of universal service policy goals. However, targeted direct subsidies from general tax revenues may be a more cost-effective solution, that can serve political universal service goals while allowing competition and innovation to flourish without inefficient regulatory market intervention.

**Deregulation**

From the consumer's point of view, deregulation since 1984 has meant progressively lower prices and improved quality and service. A cycle of continued value-added improvement based on technological innovation provide choice and encourage creativity, allowing consumers to customize services unique to professional and personal needs.

The 1996 Telecom Act was an important phase in the slow march to deregulation. The Act called for local exchange carriers to get out of long
distance, telecom manufacturing, and electronic publishing. Its objective was to stimulate competition in the local market by opening up incumbent facilities to CLECs and once markets were proven opened, to allow the incumbents to compete in long distance. While the Act is seen by many to be deeply flawed, overall it has been a boon to the telecoms since innovation would have been further stymied otherwise.

Today, to the FCC’s credit, the regulator is in the process of completing a strategic plan that calls for it to transform the agency from an industry regulator to a “market facilitator”. While the plan is certainly not radical enough to call for its own demise, the regulator acknowledges that the US telecommunications market will be “characterized predominately by vigorous competition that will greatly reduce the need for direct regulation”. As in alcoholics anonymous, acknowledgement is the first step in recovery. The draft plan also calls for restructuring the agency along functional rather than traditional technology lines of wire, wireless, satellite, broadcast, and cable communications. The FCC fully understands the rapid convergence which is taking place in the industry, and its own current inefficiency and inability to keep pace.

Unfortunately, the agency’s time horizon is way off the mark, as it is looking five years out. This slow pace of reform is unacceptable when competition to the local loop already exists in many markets today, and convergence is rapidly
underway. In addition, the plan has no details on downsizing its workforce and budget, which would provide the best clue that it is serious about eliminating its role as regulator.

A Closer Look at Two Incumbents

Deutsche Telekom

The German government carved Deutsche Telekom out of the postal system in 1990, with the intention to create a global player that would be an engine of job creation. By revenue, Deutsche Telekom is the third largest telecom in the world, after Nippon Telegraph & Telephone of Japan and AT&T, and is the largest European telecommunications company. The company has performed very well, doubling its share price last year with net income a startling DM4.4 billion in 1998.

Deutsche Telekom maintained its fixed handset voice transmission monopoly until January 1998, the deadline established by the European Union for deregulation. Partial privatization had already occurred in November 1996 with 28 percent of the firm sold to the public. Today, the company is far from being fully privatized, as the German government still owns 65 percent of the telco. Deutsche Telekom still enjoys monopoly status via control of the local loop and has used it to great strategic advantage over competitors.
Deutsche Telekom's business consists of its traditional telephone network, currently 49 percent of its revenues, which is 19 percent less than a year ago. Mobile is a distant second with 11 percent of the business, up 20 percent from last year. The rest of the firm's businesses each comprise less than 10 percent of total revenue, with fastest growth coming from interconnection services, international, datacom, and terminal equipment.

Competition immediately entered the market in 1998 and drove down prices, clearly benefiting consumers and businesses. In all, 200 new telecom service providers and 1,300 companies operating in non-licensed sectors came into the German market. As a result, Deutsche Telekom lost 30 percent market share of peak-time long distance business. By January 1999, the German telco was forced to cut prices by 60 percent translating into a loss of DM 2 billion, although

### Giant on the Prowl

**Business Breakdown**

Deutsche Telekom's revenue for the first three quarters of 1999, in billions of dollars

<table>
<thead>
<tr>
<th></th>
<th>% of Total Revenue</th>
<th>% Change from Year Earlier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone network comm.</td>
<td>$12.18</td>
<td>49%</td>
</tr>
<tr>
<td>Mobile comm.</td>
<td>$2.66</td>
<td>11%</td>
</tr>
<tr>
<td>Data comm.</td>
<td>$2.07</td>
<td>8%</td>
</tr>
<tr>
<td>Interconnection services</td>
<td>$1.92</td>
<td>8%</td>
</tr>
<tr>
<td>International</td>
<td>$1.67</td>
<td>7%</td>
</tr>
<tr>
<td>Special value-added services</td>
<td>$1.37</td>
<td>5%</td>
</tr>
<tr>
<td>Broadband cable/broadcasting</td>
<td>$1.35</td>
<td>5%</td>
</tr>
<tr>
<td>Terminal equipment</td>
<td>$0.89</td>
<td>4%</td>
</tr>
<tr>
<td>Other services*</td>
<td>$0.78</td>
<td>3%</td>
</tr>
</tbody>
</table>

*Includes T-Online

Sources: Deutsche Telekom, Datastream, WSJ, 3/3/00
net revenue grew 1.5 percent over 1998. In order to control costs, Deutsche Telekom has reduced its labor force from 230,000 employees in 1995 to 170,000 in 2000. Deutsche Telekom has not yet resorted to layoffs, as AT&T did in the 1980s to significantly reduce headcount. So far, cost cutting has contributed more to Deutsche Telekom's earning growth than new business, although the incumbent has began to innovate along all of its businesses spurred by deregulation.

To defend its business, Deutsche Telekom has engaged in a classic price war, sustained by shrewd management of German government regulators. Deutsche Telekom charges competitors DM25.40 per month for interconnection service fees for access to its local loop, which is its monopoly franchise. Competitors must pay Deutsche Telekom this flat fee plus an additional fee of 2.7 pfennip/minute, which is considered low. The monthly flat fee competitors pay Deutsche Telekom is clearly predatory since Deutsche Telekom only charges consumers DM21.39 per month. It will be able to sustain the price war in long distance and international calling due to its strong financial position. This represents a classic case of conflict of interest since the majority owner is also the regulator and therefore, this fee structure is likely to be contested by competition. However, regulators have also determined that only dominant firms with more than 25 percent market share must offer universal service, leaving Deutsche Telekom vulnerable to cherry picking.
Deregulation has had excellent results for consumers and business customers in Germany. The cost of long distance fell 85 percent as new companies captured 35 percent of long-distance and international fixed calling. As a result of competition, Deutsche Telekom’s profits fell 50 percent in the first six months of 1999 even though its fixed-handset local share is 98 percent, giving a clear indication of cross-subsidization of local service.

The European Commission Competition Directorate has highly encouraged Deutsche Telekom to sell at least 51 percent of its cable business. Auction of its cable TV network is estimated to yield DM20-25 billion. Deutsche Telekom is structuring the potential sale very carefully in order to control the creation of competition. It plans on auctioning off the cable network to several buyers by splitting the cable business into nine regions to be auctioned off separately. Its cable network currently reaches 18 million of 23 million households, providing a viable competitive alternate to the local loop. Deutsche Telekom says that the cable auction is a positive event, since it is currently an unprofitable business and because it anticipates that competition in the local loop will eliminate pricing regulation.

The following is Deutsche Telekom’s chief competition by business:

- Fixed Wireline: Mannesman Arcor, o.tel.o
- Mobile: Mannesman/Vodafone, D2, Mobilkom, Talkline
• Resellers: ACC, Mobilcom, TelePassport, Viatel, Esprit, Thyssen Telecom, Tel OnFax

• Facilities based: DTAG, Arcor/D2, o.tel.o, Interkom, Worldcom

• CLECs: COLT, MFS, ISIS, Net Cologne

• Internet service providers, such as AOL

Deutsche Telekom has weathered the competitive onslaught fairly well as deregulation has forced the company to move faster and innovate while it is still highly protected by the state. The telco boasts of having the largest on-line Internet portal in Europe, its T-Online service, which has been growing at 46 percent per year, with 3.3 million subscribers. Unlike the AOL/Time Warner merger, Deutsche Telekom does not plan any content merger but instead will operate as a conduit for multiple content providers. AOL acknowledged the might of Deutsche Telekom’s Internet business by recently accusing the telco of cross subsidizing its T-Online service.

Other winning businesses for Deutsche Telekom include mobile, with its t-D1 service which brings in DM65 million per year fueled by the acquisitions of One2One and max.mobil, and its ISDN service, which has been growing at 33 percent per year, connecting nearly 12 million of 47 million fixed line customers. Deutsche Telekom is in the process of rolling out ADSL, which will eventually completely replace ISDN service.
Deutsche Telekom's strategy is to focus on "four pillars" of value creating businesses: Mobile, Consumer Internet, Data IP (global connectivity for business customers), and Access (to the local loop).

*Management of Deregulation and Innovation at Deutsche Telekom*

In order to get a better understanding of how Deutsche Telekom prepared for privatization for this paper, I interviewed Hagen Hultsche, management committee member. He is responsible for research and development, information systems (including the telecom and information platform), total quality management, T-Venture, information and innovation management, and enterprise-wide organizational structure and management.

Hultsche came to Deutsche Telekom, in 1993, from Volkswagen with prior experience exclusively in information technology (IT) management. His first challenge was to educate former state employees with basic business management skills training in order to create an entrepreneurial focused culture. He formed profit centers as a new way for IT management to work with internal clients instead of servicing them from a cost center structure. He also explained that Deutsche Telekom is different than US telecoms in that they sell soup to nuts telematics solutions to customers, similar to EDS's outsourcing strategy.

Hultsche also instituted stretch service quality goals for IT management as part of the change program. He began by setting a quality goal of ensuring that
during 50 percent of the days in the year, systems were up 100 percent of the
time, with zero failures in the system. Each morning he received a report of all
systems from responsible managers, 100 in all. Initially, there were zero days
operating at 100 percent and Hultsche said it was clear that the managers felt
this was an impossible task. He challenged them to work to figure out how to
reach the goal through trouble shooting and collaboration. After 3 years,
Deutsche Telekom achieved the goal of 50 percent of days per year at 100
percent no failures and Hultsche fully expects they will reach 80 percent of all
days per year.

He said these former government workers originally didn’t think it could be done.
But after they started achieving the goal they became believers. He believes a
fundamental cultural change has been achieved: “Employees don’t think in terms
of allocated work but instead think along a broad process, so that what they are
working on is done in the context of the bigger picture.” He said this has led to
improvement in team work, innovative thinking, and quality. In addition, the
company began giving financial incentives with the opportunity for employees to
earn bonuses, including 150 percent bonuses negotiated for stretch goals.

Deutsche Telekom also instituted a Total Quality Management (TQM) process it
calls “Tempo”. It is designed to increase productivity and efficiency by improving
the management of organizational processes. The corporation identified 15 core
processes and assigned responsibility to each board member. As there are nine
board members, some own more than one core process. This top-down ownership has helped drive organizational commitment to TQM.

New innovations in telecom technology bring continuous transformation to the German telecom, including technology capable of expanding bandwidth and the ability to provide superior quality. In addition, an Internet protocol version six will soon be available that allows for the prioritization of data that will help ameliorate volume constraints in data transmission.

Hultsche is very excited about new Texas Instruments technology that Deutsche Telekom can potentially deliver into homes. The new technology will enable customers to beam one image displayed on a wall via laser driven technology in their home from a box without a tube for television, movies, the Internet, and other computer applications. It will have excellent acuity via a chip that has 10,000 mirrors, each beam ing an individual laser colored light. The home entertainment technology includes DVD, digital signature processor (DSP) and a digital live processor (DLP).

Hultsche also envisions data volume improvements, with the capacity to carry over 100 gigabits of data. He explained that speed over fiber optics cannot be improved since the velocity of light is constant (although improvements can be made but are not discernible to humans).
Of particular interest in changing the management of innovation at Deutsche Telekom in order to respond to competitive pressure, is the formation of T-Venture, a fully owned subsidiary. Deutsche Telekom contributes initial funds to new ventures through T-Venture, then gets outside venture capitalists to fund the rest. Some examples include Virtual Photonics, which is already in the black, Telescout, a search engine and B-Net, which makes software for fiber optics network. Hultsche explained that employees completely changed the concept of B-Net to meet market requirements, and further believes this would not have happened if the new business were operated internally by Deutsche Telekom employees. He credits this to the opportunity for internal entrepreneurs to own an equity stake in these start-ups.

Challenges

There are two important challenges for the incumbent German telco:

1. Internationalization is not occurring fast enough, and
2. The organization still moves too slowly.

Deutsche Telekom needs to improve its speed to market. Deutsche Telekom may become an acquisition target, particularly in light of the Vodafone takeover, which has broken up “Germany Inc.” The telco is too local, starting with its brand. Hultsche discussed the possibility of rebranding the parent “Global Telecom”, of which Deutsche Telekom could become a subsidiary brand.
Deutsche Telekom has so far failed to make headway in its globalization goal, which may be due to its majority owner. Most governments would likely object to potential mergers with any company owned by another government. However, Deutsche Telekom came close to merging its information technology (IT) infrastructure with France Telecom's IT infrastructure under a new company to be named "Synergy" and located neutrally in Brussels. But, according to Deutsche Telekom, France Telecom didn't believe it was a marriage but rather a takeover. Like most merger failures, a lack of trust between CEOs sabotaged the business. The merger would have saved each organization $1 billion per year: a huge opportunity loss due to control issues since the deal killer involved non-agreement on naming a CEO to lead the organization and moreover, which telecom this new head would come from.

Through its venture with Sprint, Hultsche says that Deutsche Telekom learned that it should not buy into any company unless it takes at least a 51 percent ownership stake. Sprint was a 20 percent deal, and although it represents a failure in its quest for internationalization, Deutsche Telekom did make a profit in the process of learning from this mistake.

Deutsche Telekom has an enormous amount of cash, due to its soaring stock price and will amass even more from floating minority stakes in T-Online and T-Mobile as part of its strategy to build its wireless and ISP activities into global
businesses. It is currently seeking to acquire a US company in its quest to
globalize and avoid a potential take-over.

Bell Atlantic

Bell Atlantic was one of the original regional bell operating companies (RBOCs)
formed by the break-up of AT&T in 1984. The FCC and the Department of
Justice gave the company monopoly power over local telephone service in the
mid-Atlantic region since at the time, regulatory thinking was that local service
constituted a natural monopoly. The company had been forbidden to offer long
distance service until this year when competition for local service was deemed
sufficient in the New York area to allow Bell Atlantic to offer long distance service
there for the first time.

Bell Atlantic operates four strategic business units:

- Domestic Telecom, which accounts for approximately 80 percent of its $32
  billion revenue in 1998
- Global Wireless, a $4 billion business
- Directory, a $2 billion business, and
- Other Business, which consists of International Wireline investments,
  accounting for less than $150 million in 1998.

Although Bell Atlantic has foreign investments in Europe, Latin America, and the
Pacific Rim, this company is primarily a regional US company. It is considered
one of the leading telecoms in the US since its customer base is significant due to its merger with NYNEX and includes the heavily populated east coast and the major metropolitan New York and Washington, DC areas.

I interviewed Jim Cullen, the President and COO of Bell Atlantic for this paper to discuss deregulation and innovation. The management of innovation at Bell Atlantic is directly linked to its management of the regulatory process. As the company is still heavily regulated by the FCC, regulatory reform is at the top of the company’s agenda in order to gain the freedom to further innovate and grow the business. Cullen has been at the forefront of regulatory management at Bell Atlantic and our discussion focused on the management of deregulation.

Cullen’s view of the telecommunications world, is that new markets, new technologies, and growing competition is creating the backdrop for increased deregulation. He explained that data is the primary driver of investment and growth and that most prices are unregulated. Consolidation, mergers and globalization of the industry are realities today. But due to outdated regulations, Cullen believes that long distance voice and data markets are still protected from full competition because the local exchange carriers are the only telcos that are “still operating by the old rules”. That is, Bell Atlantic remains heavily regulated, fenced out of new markets, limited in terms of opportunities to grow and invest, particularly with respect to mergers and acquisitions, and subject to an outdated view of the telecom marketplace.
Cullen has been personally involved in supporting and implementing the Telecom Act of 1996, which according to Jeff Lanning, of the FCC, is legislation that was primarily authored by the RBOCs. Cullen exhibited extreme frustration at the extensive process of proving that markets are open to local competition in order to offer long distance service. He explained that Bell Atlantic competitors have been tenacious in blocking entry into new markets by working through the FCC. Further, he explained that regulatory pricing is set below the costs to Bell Atlantic, providing subsidization to competitive entry into local markets.

Cullen’s view is that the real prize is the high-speed data backbone market, not long distance, although long distance is important in order to offer a full range of bundled services to customers. He believes instead, that the Internet transport market is where the growth opportunities lie. This market is actually becoming more concentrated and less competitive, according to Cullen, since backbone traffic is controlled by a handful of carriers and dominated by AT&T and MCI Worldcom.

This market situation has made regulatory reform a basic component of Bell Atlantic’s strategy and is essential to providing a platform for innovation and growth. Bell Atlantic’s agenda includes immediately opening the markets; streamlining the regulatory review process for determining that local markets are fully competitive; the end of reciprocal compensation, which Cullen believes
discourages investment in access facilities; and restructuring of the regulatory process.

Bell Atlantic spends an enormous amount of time and money on regulatory management and is fully staffed to cover the FCC and congressional hierarchies in order for its agenda to be heard. Nearly four years after the Telecom Act, Bell Atlantic received the first RBOC approval from the FCC to enter the long distance market. Cullen believes that telecom pricing and market entry regulations remain stubbornly in place due to politics, history, and full employment for regulators, economists, and lawyers. Further, he pointed out that GTE (which is merging with Bell Atlantic pending regulatory approval), Sprint, and Southern New England Telecommunications have been providing long distance and local service to customers in full and fair competition with the major long distance providers with no problems or complaints.

It is clear that regulatory management at Bell Atlantic provides a distraction from the real business of ensuring quality and the creation of innovative new services for customers. Although Cullen did not have a number on costs involved in this vital function, it represents sizable opportunity costs to the company that are fully reflected in its market valuation.
Innovation in the Telecommunications Industry

Innovation in this industry has been created in three important areas:

1. Local service
   - Traditional wireline
   - Cable access
   - Wireless

2. Trans-network providers that have built the Internet backbone, and

3. Equipment manufacturers

As discussed previously, competition to the local loop is intensifying due to the promise of connecting homes and businesses seeking access to the Internet and media services. Traditional wireline is preparing for broadband data transmission by deploying ADSL, cable companies are upgrading their lines to provide two way voice and data communication, and wireless providers are perfecting personal communications services. Trans-network providers have invested heavily in laying fiber optics networks to handle the market demand for moving huge amounts of data world-wide.

But the explosion in innovation in the telecommunications industry has largely been created outside the traditional service provider telecos. Equipment manufacturers, such as Lucent, Northern Telecom, and Cisco, have largely been the engines of innovation while the traditional telco's role has been to provide a
means for transmission of content delivery. This does not mean that telcos have not innovated, however.

Competition created by privatization has contributed to increased innovation but along three main areas providing a means of differentiation:

1. Regulation
2. Brand, and
3. Service

Regulation
Regulatory differentiation occurs primarily through the policies of the FCC, which are heavily influenced by telco lobbying through Congress, since Congress has oversight authority over the agency. The local exchange carriers have relatively low market caps compared to other service providers since there is clear recognition by the market that the limits imposed on them by regulation curtails their ability to innovate, offer new services, and freely engage in mergers in order to grow.

Brand
Brand is extremely important to telecom service providers. The leading telcos invest heavily in brand promotion. This is one area where incumbent providers have an edge over new entrants since they have a long relationship with
customers. Jim Cullen, from Bell Atlantic, notes that ironically, the monthly bill provides a vehicle for communication and trust with their customers, keeping the brand at the top of the minds of customers. This relationship provides Bell Atlantic a competitive advantage and illustrates how incumbents can position themselves for future service bundling opportunities.

**Service**

Telecom service providers will become truly distinctive through differentiation in service. Clear, fast connections, new services, bundled offerings, and best in class customer service will provide the edge in the future for telcos competing to retain and acquire new customers.

**Implications for Privatizing Incumbents**

As the telecommunications market has deregulated and been opened to competition, new entrants have concentrated first on offering the services whose rates have been deliberately overpriced by regulators to generate cross-subsidies, estimated in the US to be about $25 billion per year in 1998. It does not take an economist to realize which services have been subsidized in this way since we only need to look at where the attackers have concentrated. These include inter- and intra-state long distance, competitive access to local exchanges via direct connection between long distance providers and business customers, as well as providing local service to business customers.
Incumbents must prepare for privatization by ruthlessly taking costs out of the business, primarily labor costs, in order to be able to lower prices to preempt competitors. This is the single hardest task since no one wants layoffs and labor cost reductions cannot always be managed through attrition. Service quality must be excellent and continuously improved in order to reduce customer switching. In addition, incumbents should organize around the customer and build essential retail skills in order to fully leverage the value of their market position, which includes established customer relationships, regulatory sophistication and deep technology expertise.

Cultural change

Cultural change can be managed by educating government workers with business management training. Incumbents facing competition should downsize through attrition and early retirement and redeploy employees through intensive retraining. Layoffs should be avoided since they inevitably lead to morale problems when the focus instead must be to create excitement and to challenge workers to give their incremental effort and creative energy to the enterprise. Privatizing entities should also use financial incentives, including equity stakes and bonuses to align individual performance to the performance of the business.

Regulatory Management

Telecoms need a deep understanding of the regulatory agenda, including the regulator’s goals and potential implications. In addition, telcos also need to
understand the legal boundaries that constrain the regulators and must have technical and economic staff with superior analytical skills. Finally, it is important that telecoms invest in lobbying regulators at all hierarchical levels of the regulator and ideally co-author the agenda.

Management of Innovation

Although traditional R&D laboratories will continue to be a source of innovation for telecoms, other management structures to spur innovation should be explored. Deutsche Telekom’s T-Venture subsidiary is an example of a large corporation investing in start-ups and allowing champion employees to share in equity spoils to increase innovation. By backing an initial investment in such ventures, additional venture capital can be attracted outside the firm to lessen the risks of investing in start-ups. Corporate backed venture-capital business should only be undertaken when there is strategic overlap between the corporate parent and the portfolio firm. Telcos should also continue to pursue other traditional ways to innovate and accelerate speed to market, such as engaging in mergers, acquisitions, and strategic alliances.

Conclusions

There is no question that deregulation and innovation in the telecommunications industry are linked in an accelerating loop. It is ironic that an innovation such as Hush-A-Phone, a cup-like device that snapped onto telephones to provide
speaking privacy, clearly a low-tech product, provided the first step that led to the break-up of AT&T's monopoly and ensuing deregulation.

Technology creates both less expensive substitutes and improves the cost of existing methods of service delivery. For example, the use of microwave technology in long haul transport, made long distance rate regulation unnecessary. New technology also creates product and service innovation via lower costs, enabling new entrants to serve new customer segments. Incumbents also push for more freedom as they begin to reap the rewards of product innovation, which reinforces the innovation/deregulation loop.

The FCC and state regulators have a long history of very poor decisions that helped delay the formation of competition in this sector. The judicial system in the US provided the impetus for deregulation in the 1970s, not the regulatory bodies. And while the FCC has its hands off of the mobile sector and Internet today, its earlier meddling that led to regional wireless duopolies contributed to the US being far behind Europe in the wireless sector.

Because of the accelerated pace of innovation that has, in turn, accelerated the pace of worldwide telecom deregulation and privatization, the role of regulation in the telecom sector should ultimately be limited to spectrum management, consumer protection and education, and the coordination of international standards and open markets. Regulation of private enterprise leads to the
inevitable consequence that companies find it easier to go to regulators and politicians for protection rather than relying on the marketplace. Regulators need to continue to enforce antitrust and consumer protection policies but they should not get in the middle of market entry and pricing decisions.

However, the FCC continues to play a role in pricing that effectively limits competition. The FCC had a long history of restricting competition by protecting AT&T’s monopoly prior to its break-up. Today, it is restricting competition, in the name of promoting it, by protecting competitive local exchange attackers, regardless of their efficiency relative to the local exchange carrier incumbents. The FCC’s intention is to open up the connection to the “last mile” by making the local exchange companies share retail services at prescribed discounts in the 17 to 25 percent range. As Michael Armstrong says, “No company will invest billions of dollars to become a facilities-based broadband services provider, if competitors who have not invested a penny of capital, nor taken an ounce of risk can come along and get a free ride on the investments and risks of [the local exchange carriers].” Deregulation effectively led to the industry pursuit of the most profitable services first, since there were enormous margins to be exploited, and the most profitable customers, businesses. The FCC needs to fully open the local market and deregulate it in order for competitors in invest in the facilities needed for full competition in broadband services.
Innovation, spurred by the promise of e-commerce, is already providing the means for fierce competition to the local exchange carriers' local copper loop. Cable, fixed wireless, low orbit satellite, fiber optics, mobile data, and now point-to-point laser-communications technology that promises to connect desktop PCs to the Internet's new long haul fiber networks are all viable alternatives to the local exchange carriers, making the need for pricing regulation to promote fair competition unnecessary. There is a clear race to connect to the residential customer to offer data services since switching costs are perceived to be high. By allowing new services to be offered without regulation, the state would encourage innovation, resulting in a broader and varied portfolio of services to customers.

Finally, where there is proof that companies are intentionally inhibiting competition, there should be severe penalties enforced by regulators and the antitrust laws where appropriate.

Innovation has, in effect, outstripped the need for regulation designed to promote competition. The very slow pace of deregulation of the telecom industry in the US argues for swift deregulation for other developed countries in order to reap the economic rewards of innovation. Rapid deregulation results in improved service, lower prices, and broader choices for customers at a faster pace. The deregulation and innovation loop has tremendous economic consequences.
providing an engine of job creation, information proliferation, and global connectivity.
Bibliography

- Althaus, Sarah, “Deutsche Telekom income falls 45% as price war bites”, Financial Times, January 21, 2000
- America Online, Annual Report, 1999
- “A New FCC for the 21st Century”, Draft Strategic Plan, FCC
- “America rides the wireless wave”, The Economist, April 29, 2000
- AT&T, Annual Report, 1998
- AT&T Investor Relations, Broker Fact Sheet, 1999
- Beardsley, Scott, “Full telecom competition in Europe is years away”, The McKinsey Quarterly, 1998 Number 2, pp.32-37
- Beardsley, Scott, and Andrew L. Evans, “Breaking the Access Bottleneck”, Mckinsey.com, 1999
- Beardsley, Scott C., and Andrew L. Evans, “Who will connect you?”, The McKinsey Quarterly, 1998 Number 4, pp.18-31
- Bell Atlantic.com
- Blumenstein & Lublin, “Amid All the Bets, One Stands Out: AT&T Ventures Into Cable”, The Wall Street Journal, November 5, 1999
- BritishTelecom.com
- Brock, Gerald W., Telecommunications Policy for the Information Age, Harvard University Press, 1994
- Compustat.com
- Cullen, Jim, President and COO, Bell Atlantic, Personal Interview, February 2000

62
• DeutscheTelekom.com
• "Deutsche Telekom Presents Overview of Global Communications Market and Growth Strategy", PR Newswire, September 9, 1999
• DJinteractive.com
• Fairlamb, David, and Jack Ewing, "Auf Wiedersehen Germany Inc.", Business Week, February 21, 2000
• FCC.gov
• Fertig, Doron, and Christopher H. Prince, David Walrod, "Current Research: What kind of telco is the fairest of them all?”, The McKinsey Quarterly, 1999, Number 4, pp. 144-148
• “German Cable Telekomlicated”, The Economist, August 21, 1999
• “German telecoms Very unGerman”, The Economist, April 10, 1999
• Global Telecommunications Primer, Morgan Stanley Dean Witter, June 1999
• Hausman, Jerry, "The Effect of Sunk Costs in Telecommunications Regulation", Presented at a conference at Columbia University, October 2, 1998
• Hax and Wilde, The Delta Model: Discovering New Sources of Profitability, 1999
• Hoovers.com
• Hughes, Simon, Competition in Telecoms, Recitation 1, Jerry Hausman Telecommunications course, MIT Fall Semester 1999
• Hultsche, Hagen, Management Committee Member, Deutsche Telekom, Personal Interview, January 2000
• "IP Telephony Taking the Telecommunications Industry by Storm", Business Wire, November 23, 1999
• “Inhouse sales”, The Economist, May 22, 1999
• "Keeping Afloat", The Economist, August 28, 1999
• Kennard, William E., “Internet: The American Experience”, An Address by the Chairman, US Federal Communications Commission, to the Conference on
"Internet & Telecommunications: The Stakes", Paris, France, January 28, 2000
• Lanning, Jeff, special counsel, FCC, Personal Interview, February 2000
• Mockett, Alfred, Chairman, CEO British Telecom, speaker at Jerry Hausman’s MIT Telecommunications course; November 8, 1999, personal notes
• Regulators’ Revenge, edited by Tom W. Bell and Solveig Singleton, Cato Institute, 1998
• Schaaf, Jeanne M., and David Goodtree, “Local Competition: Working Up a Head of Steam”, The Forrester Brief, January 26, 1999
• Shaw, James, Telecommunications Deregulation, Artech House, 1998
• Strategisgroup.com
• “The Race to Rule Mobile”, Business Week, February 21, 2000
• The Internet Data Services Report, Morgan Stanley Dean Witter, August 11, 1999
• The McKinsey Quarterly, 1999 Number 4, pp. 134-143
• Thurow, Lester C., Building Wealth, 1999, Harper Collins