



## The Gordian Knot

**Political Gridlock  
on the  
Information Highway**

W. Russell Neuman

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This accessible introduction to the current debate about the development of a National Information Infrastructure locates the debate in its historical context and outlines a bold vision of an open communications infrastructure that will cut through the political gridlock that threatens this "information highway."

The authors—social scientists as well as technologists—detail what is wrong with the political process of NII policymaking and assess how different media systems (telecommunications, radio, television broadcasting, and the like) were originally established, spelling out the technological assumptions and organizational interests on which they were based and showing why the old policy models are now breaking down. This analysis leads logically to a policy proposal for a reformed regulatory structure that builds and protects meaningful competition but abandons its role as arbiter of tariffs and definer of the public interest.

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## Introduction

As legend has it, in ancient Phrygia on the vast plateau between the Black and Mediterranean Seas in what is present-day Turkey, King Gordius tied a large knot of tangled rope. He took special pleasure in challenging visitors to try to untie the Gordian Knot, claiming that he who did would rule all of Asia. Many tried and failed. When Alexander the Great passed through Phrygia, he was of course confronted with the traditional challenge, which he accepted without hesitation. He drew his sword and cut the Gordian Knot with a single dramatic stroke.

In common usage today, the Gordian Knot metaphor is used to identify problems that require a bold stroke and fresh thinking for a successful resolution. Given the frustrating complexities of so many of today's social problems, the metaphor is particularly seductive to the policy analyst and, alas, we have succumbed. It is an unlikely title for our book because, generally speaking, we share a rather strong skepticism of dramatic and simple resolutions proposed for complex political and economic problems. But we have become convinced that in this case the metaphor is apt. We will attempt to persuade our readers that our conviction is well founded and our judgment sound.

The focus of our case study is the entangled policy debate involving swift and unprecedented changes in the economics, control structure, and technology of human communication that we identify as the communications revolution. The historical driver here is technology. We will argue that the generic properties of the evolving communications technologies are well understood. The social, economic, and political ramifications of these changes, however, represent a significant and enduring puzzle. Although far from technological determinists, we believe it is important

to acknowledge that the technology of the integrated digital electronic network has inherent properties that distinguish it from the disconnected mix of phonograph records, letters, books, newspapers, and telephone, computer, and broadcasting systems that preceded it. What is subject to our control is how these technologies are structured to meet human ends, and it is in the spirit of that challenge that we proceed.

In selecting a focus for analysis, authors are frequently counseled to pick a historical case of appropriate obscurity rather than a prominent or current event. The inevitable critical reactions of those with vested interests, and the likelihood that new developments will simply overtake the analyst, put the researcher in an awkward position. In ignoring such well-considered advice, we hasten to explain that this book is a bit of an exercise in catharsis.

We characterize ourselves as veterans of the high-definition television (HDTV) wars of the 1980s, a particularly intense national and international competition for technical preeminence in advanced television. Through our association with the Advanced Television Research Program at the Massachusetts Institute of Technology, we conducted a series of studies on audience reactions to new display technologies and a parallel series of economic and policy studies of HDTV. Although from our point of view we were simply conducting the best scientific research possible, we were well aware that we were perceived as being on the "MIT team" and thus supporting MIT's entry into the TV standards sweepstakes. After work we would gather to reflect on the day's events and discuss which company or research laboratory was winning or losing the most recent technical competition. But in these discussions we were repeatedly struck that our fellow researchers seemed oblivious to the terrain of the battlefield on which they were fighting. As social scientists, whose careers would presumably not be judged on the basis of which engineering design won out, we came to define ourselves less as soldiers than as war correspondents and strategists, chroniclers and students of an intriguing and serious techno-economic conflict. Why did so few understand the rules of the game?

We attempt to accomplish three things in this book: explain the current technological debate in terms that a nontechnologist can easily understand; put the technological debate in a broader historical context,

focusing on the political economy of technical change; and offer some conclusions on what a policy framework for managing the communications revolution should include, as well as a critique of the recently passed Telecommunications Act of 1996.

This is a book about how technical change is forcing a policy paradigm shift. Since the era of the robber barons, the technical character of telegraphy, telephony, and broadcasting required that each be regulated as a public-service monopoly. The digital revolution (in which HDTV is a relatively minor development) will not require regulated monopoly provisions; rather it will be best served by open, undistorted, healthy economic and technical competition. As we review the literature, we find universal acknowledgment that in a vaguely defined and distant future, competition will be the norm; but until then, there must be new legislation and armies of regulators to manage the transition. This strikes us as a big mistake. The Telecommunications Act of 1996, for example, contains more than 100 pages of detailed legal mandates and prohibitions in an ill-advised attempt to micromanage the transition to deregulation rather than cut the knot. The act calls for more than 90 bureaucratic inquiries, evaluations, and rulings by the Federal Communications Commission as part of its implementation—which, despite the FCC's best intentions, are likely to drag on for years. Some provisions of the act were challenged in court within hours of its being signed into law.

The act will only delay and distort the process unnecessarily. It is best to proceed quickly. It is fruitless to attempt to untie the knot one cord at a time. We term our proposal Open Communications Infrastructure (OCI), and it will be developed in some detail in the pages ahead.

There are two schools of thought in communications regulation, reflecting the polarization of economic theory more broadly defined: one emphasizes the free market, and the other focuses on the need for at least some regulation. Our analysis proposes a third perspective. The conservative free-marketeers emphasize that market competition is the most efficient allocative mechanism. According to this view, the regulators are the bad guys because they afflict the open market with the distortions of political power. More "liberal" policy analysts, however, point out that although markets are indeed generally efficient, there are classes of



market failure that require authorities to step in from time to time and substitute their judgments for those of the market gone askew.

The conservatives argue that the regulators, although perhaps well intentioned, are slow to respond to technical change, ill-equipped to assess value and benefit, and inevitably subject to distorting political pressures. We agree. The liberals argue that left to their own devices, the capitalists are likely to be rapacious, monopolistic, and cavalier about the public interest. We agree with this observation as well. As a result, we believe that a new paradigm for regulation is required—one that puts a reformed regulatory structure in the position of ensuring meaningful competition while abandoning its role as arbiter of tariffs and definer of public service and public interest.

The need for a dramatic shift in the policy paradigm is supported by our observation that technical change in this field is proceeding much more rapidly than has been generally acknowledged. Much of what is now considered to be decades away will likely be of economic significance in just a few years. We watched this temporal cognitive distortion again and again in the HDTV wars. Our associate, William Schreiber, obtained funding in the early 1980s from a consortium of American television networks and equipment manufacturers to provide an American alternative to the Japanese model of HiVision. From the beginning, he suggested to his sponsors that advances in digital technology dictated a close look at a digital television system—not just a higher-quality picture. His appeals were repeatedly rebuffed by the industrial engineers as being too academic and likely to delay the development of a practical system; they considered digital television a good idea for new systems a decade or two hence. For eight years industry continued to submit designs for analog HDTV systems until the very last day to file proposals with the Federal Communications Commission. Late that Friday afternoon in June 1991, an unknown new proponent, General Instrument, a cable equipment company working quietly with some of Schreiber's former students on the periphery of the HDTV community, put forward a working prototype of an all-digital system. Why did they propose such a system while the central players did not? Perhaps because they did not know any better—that is, they were not caught up in the prevailing technical ideology that dictated that such a system was too impractical and difficult

to be achieved for decades. Within four months, each of the other four consortia abandoned their previous systems and demonstrated all-digital systems of their own. When necessary, in the process of technological development, decades can shrink to months. It is a pattern that is repeating itself frequently in technology development, and if our arguments find some favor, perhaps in policy reform as well.

The burgeoning Internet, the information highway metaphor, and the idea of a National and Global Information Infrastructure are central to our thesis. The metaphor draws attention to the parallels between transportation and communication. Highways and infrastructure are beneficial public entities that facilitate communication and trade. They are tied to national productivity and competitiveness, and although usually built by private contractors, they are generally designed and regulated by public authorities. This public-private tension is critical. In the late stages of the Clinton transition in mid-December 1992, there was a high-profile discussion among business executives and policy advisors in Little Rock, Arkansas. AT&T Chief Executive Officer Robert Allen remarked that the information highway was of great importance to the economic future of the United States, but that it was not a matter for federal involvement: private industry would design and build the highway, and government regulators should simply get out of the way. There was an awkward flash of tension as Vice President-elect Gore jumped up to note that as with the interstate highway system, the private sector might not be able to go it alone; it was an issue simply too important to be left to commercial largesse. President-elect Clinton broke the tension with a joke, and the conference moved on. But the issue to which we shall refer as the Great Debate—that is, the role of the state versus that of private enterprise—remains.

Many adherents of Gore's school of thought draw on federal involvement in the design and funding of the interstate highway system during the 1950s as the historical model for the electronic highway of the next century. For us, however, the most telling historical parallel would be the railroad robber barons of the late nineteenth century. The federal government, through a variety of incentives including generous land grants and subsidies, did its best to encourage private investment in railways in the interest of commercial trade and geographic expansion. Although

there is continued debate among economic historians on the importance of rail investment to economic growth, the huge fortunes amassed by Carnegie, Gould, Vanderbilt, Morgan, and Harriman speak eloquently to the question. Once the infrastructure was built and was threatened by devastating competition, the barons colluded to set prices and protect their oligopoly. Farmers and traders who depended on the rail system to transport their produce to market were outraged at the exercise of market power by the barons, and demanded federal intervention. The American route system was largely completed by the 1890s. It was not until 1888 that the Interstate Commerce Commission (ICC), predecessor of the FCC, was established. Furthermore, it was not until the early 1900s that the Congress and the courts finally gave the ICC the legal authority to exercise meaningful oversight. In retrospect, we have at hand a treasure trove of fifty years of economic and legal chaos—flagrant cases of stock manipulation, price rigging, court cases dragging on for decades, even gun battles—as entrepreneurs fought with each other and with the government to win control of huge segments of the system. The result was too dynamic perhaps to be characterized by the currently fashionable term gridlock; perhaps the trench warfare of World War I better captures the spirit of the stalemate of that era.

AT&T's Allen tells Vice President Gore to get out of the way—it sounds right, resonating with politically conservative orthodoxy. But historically that is not the way it plays out. If a regulatory structure can be manipulated for profitable advantage, it will be. Those who benefit and have become most adept at manipulating the regulations wearily assert the need to do away with government regulation altogether, and it is this delicious irony that we propose to sidestep by cutting the knot. Although we should move directly to meaningful competition in the electronic network of networks, it must be with the understanding that, despite their rhetoric, real competition is not what the CEOs have in mind. Thus there is a continuing and important role for government.

The first chapter introduces these central themes and describes the players and stakes. As we write, a carefully negotiated legislative package entitled the Telecommunications Act of 1996 has just been signed into law. Although the legislative rhetoric celebrates competition and deregulation and the act is described by some observers as encouraging

open competition among different industry segments, it is in fact a delicately negotiated package of deregulation, partial deregulation, and re-regulation. The key to the act's character is the use of the term "safeguards." Safeguards in the rhetoric of the legislation speaks to rules and procedures to restrict the potential of the vestiges of monopoly abuse until "true competition" comes to pass. Each of the players wants the safeguards to apply to everybody else, and each will work the evolving system with considerable skill to block any action perceived to be contrary to their interests. As usual, the devil is in the details—and there are details aplenty. Some have jokingly termed the new legislation the "Communications Attorneys' and Consultants' Full Employment Act of 1996." In our view such legislation, like the original railroad legislation, will tend to forestall and constrain real competition, perhaps as then, for decades. New legislation or not, our near-term fate is gridlock.

The second chapter develops the argument that digital electronic networks such as the Internet are not like railways and highways, nor are they like their analog electronic forebears in telephony and broadcasting. The generic properties of the new networks render them inherently unfriendly to monopolies, hierarchies, and centralized control. The locus of control migrates from systems operators to users. The movement from single-purpose to multipurpose networks enhances the capacity for competition. The century-old traditions of common carriage and public-trustee regulation become unnecessary burdens, while both regulators and systems operators deny that their expertise in regulatory gamesmanship is no longer relevant.

The third chapter returns to the central question of the appropriate role of the state in building and maintaining public networks. Despite the American predilection for private ownership, the argument that there is scant need for government involvement in the networking business finds little precedent in economic history.

Chapter 4 focuses on the productivity paradox. The information infrastructure, we argue, is the key to international competitiveness in the information age. Networked information systems that work well become the most important potential competitive advantage, although the connection between information technology and productivity, it turns out, is frustratingly difficult to demonstrate.

The fifth chapter analyzes a series of case studies in the recent history of American public communications to illustrate the paradox of the partially regulated and partially competitive markets for communications services. We review the painfully awkward and largely unintended federal trajectory toward deregulation of telecommunications, the parallel battles in radio and television deregulation, the computer network wars, and the continuing battle for control of wireless communications technologies.

In chapter 6 we return to our policy proposal for an Open Communications Infrastructure. We conclude that, based on the economic history and technological and political analysis presented in the preceding chapters, the Gordian Knot must be cut.

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## Political Gridlock

From a media consumer's point of view, everything is in its proper place. To listen to music or the news, there is a radio in the kitchen, beside the bed, and of course in the car. The TV set is in the den, with a smaller one in the bedroom. For a newly released movie, we go to the suburban multiplex. Like clockwork, these movies will appear next in the video store, then on cable, and eventually on broadcast TV. Given the taken-for-granted natural order of the motion picture release cycle, one almost unconsciously calculates whether to go to the theater or wait until a new film is released on video or broadcast on television. Books can be found in the bookstore. Magazines come in the mail, sandwiched between advertising brochures. The newspaper reliably hits the front porch every morning before seven o'clock. The telephones in the kitchen and den stand at the ready. Nobody turns the system off at midnight so that sleep will not be disturbed. These media have become integrated into the rhythm of daily life in the industrialized world. Somehow accepted practices have evolved, dictating when and to whom a phone call is socially acceptable. The newspaper is read over morning coffee, the TV is turned on as soon as the dinner dishes are cleaned up.

The modern newspaper has been with us since the 1830s, the telephone since the 1870s, magazines since the 1890s, radio since the 1920s, TV since the late 1940s. In each case, when a successful new communications technology evolved, it did so by wedging its way into the daily rituals of human life. The popularity of television pushed the radio from the living room to the kitchen and bedroom, but not out of the house. Radio programming evolved from live comedy and drama to music, news, and call-in talk shows. There were only a few economic casualties

of this expansion. The advent of broadcasting, for example, put newsreels and newspaper “extras” out of business. But in the end, the norms (and the underlying economics) of public communication have become crystallized and routinized. Each medium plays to its strength. A compact disc is optimized for the reproduction of high-fidelity music. One could have designed the telephone system for delivering broadcast high-fidelity music on demand, but the system instead was optimized for dial-up two-way voice communication.

The digital revolution in communications technology disrupts this relatively stable equilibrium of technology, economics, and human behavior. For the last 150 years, as new communications technologies were invented and introduced to the public, the successful ones were those that elbowed their way to a place at the table. To protect themselves, they became differentiated. For the most part, they created *de facto* monopolies and reaped spectacular profits.

The communications revolution, however, has set off a technical implosion. Through digital processing, a single medium can offer all the services once provided by a range of media. Packaged and print media can move to electronic delivery; the telephone company can deliver multichannel television; the cable company can provide telephone service; and each of these formerly distinct services (along with other competitors) can provide electronic home shopping, electronic encyclopedias, magazines and newspapers—all delivered to high-speed home printers. What were once noncompeting, parallel, and highly profitable industrial sectors of the economy have all been thrown into the same electronic marketplace. The cash flow of this new industry will probably significantly exceed the combined totals of their individual predecessors. New forms of transaction and subscription services on top of traditional information and entertainment media will fuel this expansion.

Some observers predict that there will be a political and economic battle of unprecedented intensity among the giants of the global media, information technology, and telecommunications industries. International megacorporations like AT&T, IBM, Time-Warner, Disney, and News Corp are the hard-nosed, deep-pocketed survivors of previous battles in which they came to dominate one or more separate media markets. The high-power politics of jockeying for strategic position has

already started in earnest. Publicly, media executives are quick to express enthusiasm for the new electronic superhighway, but behind closed doors they acknowledge that the media revolution is a potential economic disaster they would have done well to avoid. Consumers meanwhile are a bit puzzled. They squint at the information highway, which to them looks suspiciously littered with hyped-up technobabble. Many suspect that emerging technologies will make media costs go up rather than down, widening the gap between the information rich and the information poor.

Most consumers lose interest quickly when asked whether their television program came over analog or digital lines. Government officials are concerned, however, because they know that decisions about technical architecture translate into economic and political winners and losers. They anticipate the upcoming battle royal, but their role is unclear. Cautious politicians seek cover from the pressures of powerful forces, while a few brave ones pursue leadership roles to hammer out compromise. On the other hand, academics who study this field are ecstatic, because the communications turf war promises to offer one of the most interesting case studies of high-powered political economic conflict ever—that is, the opportunity of an academic lifetime.

Our intent in this chapter is to introduce the key issues and themes surrounding the transformation of the political and economic life of the nation arising from the diffusion and growth of digital computing and communications systems. Some readers may be disappointed that we largely ignore the fiery debates and ferocious turf wars that result as the communications titans struggle to develop future markets while defending existing ones. Instead we present a long-term view of the evolution of information and communications technologies and services over the centuries, and draw from this picture what we hope is a simple conclusion: the time has come for an Open Communications Infrastructure. As we envision it, OCI promises to eliminate the political gridlock affecting information and communications technologies, and—if we may break our promise not to indulge in the political rhetoric of the moment—it will speed us along on the information highway toward the information-intensive society of the twenty-first century.

First we will introduce the players vying for control of the information and communications systems and the playing field of economic conflict



where gridlock is one of the most important weapons. We then address the question of global competitiveness, which turns out to be rather difficult to assess in real time as we hurtle through cyberspace and as economic activity becomes increasingly difficult to measure using traditional tools. We take up the issue of whether the United States is facing continued stagnation in its standard of living on an information highway paved by low-wage workers, or conversely, whether the nation has dynamically restructured industry and raised productivity to enable future economic growth. These issues will be addressed in later chapters. First, the clash of the titans—now playing in the halls of Congress, in the courts, in the marketplace, and in the media (if not at the local cinema)—will be reviewed.

## The Clash of the Titans

### Historical Precedent in Economic Conflict

Economic historians may counsel less scholarly enthusiasm and more hard-edged realism regarding the process of economic change: Large-scale economic turf wars, they like to point out, are in more than ample supply. In U.S. history the festering tensions in the industrial North and the agricultural South culminated in the Civil War, which some claim was as much about agricultural economic independence as it was about slavery (Walton 1994). Following the war, the westward expansion was marked by a battle between two agricultural sectors, cattle ranchers and farmers (Degler 1967). In the 1890s, the battle lines shifted to monetary policy. The conflict between forces in favor of maintaining a gold standard and those advocating the free coinage of silver was settled by the election of 1896 (Friedman 1963). The heat generated by this dispute, however, far exceeded the ultimate economic importance of its resolution in favor of a gold standard.

The nineteenth century witnessed technological change in the nature of networks, with the transition from roads and canals to railroads. After the turn of the century, technological change continued, from railroads to motorized trucking and ultimately air transport. In communications there was the introduction of the telegraph in 1844, and fifty years later the transition from telegraph to telephone. These developments brought

into being the era of the robber barons. The railroads were the first large-scale exemplar of corporate capitalism. The centralized economic power of these new corporate entities was unprecedented, and the capacity of the government to respond to abuses and exercise legislative oversight predictably lagged for several decades. Significant federal legislation affecting the nature and future structure of U.S. transportation and communications networks took a long time to emerge. This legislation included the Interstate Commerce Act of 1887 and the Sherman Anti-Trust Act of 1890, which attempted to define the problem and establish the jurisdiction of the federal government in regulating such infrastructure (among other things), but which mandated little power of enforcement. The Mann-Elkins Act of 1910 and Clayton Act of 1914 after a century of *laissez-faire* policies finally put some teeth into federal enforcement. Realpolitik legislation during the 1920s countenanced AT&T's *de facto* hegemony for the next sixty years, but left sufficient grounds for continual antitrust challenges, culminating in the 1982 breakup.

In the 1990s, we are experiencing technical change in communications and transportation at a pace similar to that of the middle-to-late nineteenth century. The wild era of post-Civil War political economy rewarded aggressive and quick-witted economic entrepreneurship. This predictably led to abuses during the period of economic restructuring. Federal authorities only belatedly recognized the dramatic character of change, and responded still more slowly to the resulting political and economic distortions. We expect that drama to repeat itself into the twenty-first century: same play, new characters, modern dress.

In the following chapters we develop this argument and propose a historically self-conscious approach for appropriate, balanced, and realistic public policy in support of an Open Communications Infrastructure. But first, the players and the play should be formally introduced.

### The Players

The would-be robber barons of the 1990s have considerable financial resources with which to expand and protect their empires. Table 1.1 roughly outlines the industrial sectors as they stand now, on the eve of convergence. The core industries represent about \$400 billion a year in

Table 1.1

Converging industrial sectors of the \$400 billion information economy: Revenues preconvergence (1993 figures in \$ billions)

Industrial sector		
\$134	Telecommunications	
	Local	\$83
	Long distance	51
124	Publishing	
	Newspapers	45
	Direct mail	27
	Magazines	22
	Books	18
	Information services	12
63	Broadcasting	
	Television	27
	Cable	25
	Radio	10
	Satellite	1
53	Computers and data networks	
	Hardware	28
	Software	20
	Data networks	5
20	Consumer electronics	
5	Theatrical motion pictures	

Source: Weller and Hingorani 1994.

gross revenues in the United States alone. As two-way electronics allows penetration into the neighboring turf of retail and information services, the estimate is expected to approach \$1 trillion a year—roughly 20 percent of the U.S. gross domestic product (GDP). The other 80 percent of the economy is directly affected by the technical and market changes in information and communications systems, as we see for example when businesses turn to information technology in their effort to engineer new efficiencies into their manufacturing cycles. It is not difficult to see why corporate boards, CEOs, and strategic planners are attracted to the idea of having a significant portion of this enormous pie become their proprietary electronic real estate.

## The Playing Field

There is a significant difference between the era of Gould, Morgan, and Carnegie and the present day. For most of the 1800s there was no federal regulatory tradition. Now there is not only a tradition, but a large number of turf-conscious bureaucracies and a comprehensive ideology of government oversight covering even the most far-flung communications industries. It may prove easier to invent new public-policy instruments than to reinvent or redirect existing ones.

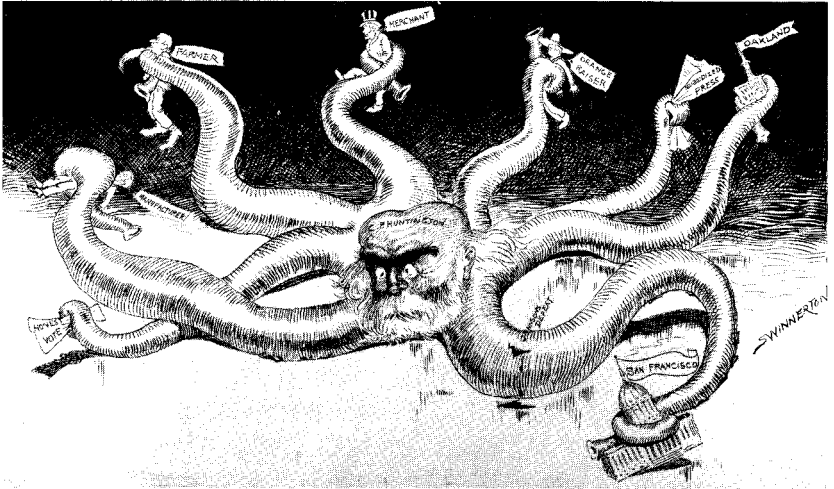
In the current policy debate one frequently hears a plea for a level playing field. All we want, telephone, cable, and publishing executives are wont to claim, is to tip the playing field back to level, to correct the imbalance that currently favors the other guy. There are several problems with such a metaphor. First, there are dozens of industrial sectors involved in this political struggle. It is hard to imagine a field tipped in twelve directions at once. Second, the direction of the tip depends on where you stand. As with the greener grass on the other side of the fence, each player eyes competitors' turf with special anxiety. It is not just self-serving cynicism; the combatants come to view these inequities with both considerable emotion and sincerity.

Perhaps a better metaphor is the Ptolemaic model of heavenly motion. As our ability to measure the movement of the sun, the planets, and the stars improved, medieval astronomers stuck to their geocentric model, but they invented little subtheories to explain the anomalies. They observed brief periods of retrograde motion and posited that planets moved not in a given orbit but in a tiny suborbit around an invisible object in the original orbit. After a while there were orbits around orbits around orbits—an unbelievably unwieldy and unlikely scenario. An astute astronomer might have sensed that the time was right for a paradigm shift.

Ultimately the heliocentric model of planetary motion resolved this problem and reintroduced a model of striking and refreshing scientific simplicity. We will make such an argument with regard to the current state of telecommunications regulation and the need for creating an Open Communications Infrastructure as the new paradigm.

For our current purposes, however, we want only to highlight the Ptolemaic character of the current system. After a century of laws written

(a)



(b)



to regulate grain elevators and railroads, which were edited to incorporate telegraphy, telephone, radio, television, satellites, and computers, then further embellished by a litigious century of accumulating case law, we have an awkwardly uneven legal playing field of Ptolemaic complexity—a playing field only a lawyer could love.

The accumulated inequities of the playing field are easy to demonstrate. Table 1.2 illustrates several examples of the current array of regulatory distinctions, ranging from subsidies to a variety of circumscriptions. These regulatory distinctions for the most part reflect the logic of the moment when these industries first emerged as identifiable business sectors. The earliest example was the post office. It made sense for the government to both provide service and encourage the free flow of information and a national sense of community, in spite of physical isolation across a sparsely populated continent, by subsidizing the conveyance of newspapers, books, and magazines. The early days of newspapers were marked by robust competition, with over a dozen dailies available in many larger cities. There was no need for regulation in such a market; indeed, the political tradition of the independence of the fourth estate and the First Amendment itself would seem to preclude it.

Broadcasting is rate regulated, with provisions that guarantee the lowest possible advertising rates for political ads; and content regulated through prohibition of “offensive” content and requirements for children’s programming. The regulation of radio and television broadcasting content was based on the “public trustee” principle. The rationale was that since the public airwaves were provided to competing commercial broadcasters without charge, there was nevertheless a public-trustee obligation to abide by publicly determined content guidelines.

### Figure 1.1

The demonization of corporate power. Whether (a) Collis P. Huntington’s Southern Pacific Railroad, or (b) Bill Gates’s Microsoft Corporation, neither the press nor the public tend to express warm feelings about large corporations. The octopus theme persists. One might predict an over time correlation between octopus cartoons and an energized antitrust division within the Department of Justice. (a) Courtesy of the California History Room, California State Library, Sacramento, California. (b) Copyright © 1995 by the New York Times Company. Reprinted by permission.

Table 1.2

Regulatory models of information industries: Government provision, subsidy, rate, and content regulation

	Provision	Subsidy	Rate reg.	Content reg.
Publishing				
Newspapers		X		
Magazines		X		
Books		X		
Recorded music		X		
Motion pictures				
Broadcasting				
Radio		X		X
Television		X		X
Cable			X	
Satellite				
Advertising				
Media				
Promotion				
Direct mail		X		
Information services				
Consumer electronics				
Postal services	X			
Telecommunication			X	
Computation				
Hardware				
Software				

Broadcasters who violate the content rules can be reprimanded, fined, and ultimately have their broadcast license revoked.

Cable television systems were originally not regulated at all at the federal level because they do not use the radio spectrum. As their market penetration and economic importance rose in the 1960s, the Federal Communications Commission, at the behest of the broadcasting industry, simply declared that cable was “ancillary” to broadcasting and thus subject to FCC regulation—a declaration of authority ultimately sustained by the courts (Kellogg, Thorne, and Huber 1992). Given that cable service, unlike broadcasting, requires access to utility poles, cable

companies are subject to contractual and regulatory constraints from local and state authorities. This local authority, however, was severely restricted by the Cable Act of 1984. Through the act the increasingly wealthy cable industry gained so much power and independence from competition and rate regulation that the resultant rise in cable rates generated one of the most curious legislative turnabouts—the Cable Act of 1992, which attempted to roll back and reregulate cable rates. In this curious political history nobody got around to regulating cable's potentially offensive content. The logic was that broadcasting through the airwaves is somehow "invasive" and should be available to all without charge. Cablecasting requires the customer to proactively order and pay for the service, and thus one can simply disconnect it in the event of perceived offense.

Because telephone service was judged to be a natural monopoly, the government agreed in 1913 to forbid new competition against AT&T. In return AT&T accepted federal rate regulation as a guard against the prospect of monopolistic tariffs. With the tradition of common carriage, however, telephone carriers, unlike broadcasters, were not responsible for the content of what was carried over the system. This precludes the use of content-oriented regulation. The need for telephonic content regulation started to gain supporters in the 1980s as commercial adult-oriented services sprang up, and both federal and local regulators decided to promulgate rules for restricted access to these kinds of services.

The absurdity of the current system can be illustrated by examining the possible regulatory constraints on a single message as it might pass through different media of mass communication. For example, established copyright laws work well with the established print model, but they break down with electronic publishing. Computers can alter text in an electronic form through a simple computer program, but it is unclear if a computer is guilty of copyright infringement. Can a computer author copyrighted material (Pool 1983)? It turns out that whether the message is transmitted electronically or in print matters a great deal to the courts and regulators. It may be of little consequence, however, to the sender or receiver, except for the regulatory impediments. Eliminating this uneven playing field, which distorts and inhibits communication, is a principal



The third stage, the battle of survival, follows a change in strategy in which the sectoral players acknowledged that there was going to be a technological shift and that an advanced electronic network would be built. But now each sector claims that it alone is qualified to build it. Each claims that there is no need for the competitor's network. Each claims to have a better technological platform to get the job done, and each also claims that the other will function as a monopolist. The telephone company, the cable company, and the computer-network company each imagine a single high-capacity network in the future, connecting every firm and every household. It would be wasteful, they argue, to build more than one network. It is true, of course, that advanced technology permits virtually all of the services under discussion to be provided by a single network. The battle for survival is over who will ultimately own this proposed single, universal, high-capacity network, forcing all the others to do business on its turf. Because each of the major players dreams of owning this great engine of economic power, they are all inclined to argue for the "special efficiencies" of the single-network model, while at the same time warning of the evil intentions of the others.

Examples abound. Robert Kavner, then executive vice president of AT&T, gave a keynote address at the 1994 consumer electronics industry trade show. Stay away from the cable industry for the provision of interactive services, he warned. "They will act as gatekeepers, restricting what goes into homes over the emerging information highway. Working with the cable industry is like picnicking with a tiger; you might enjoy the meal, but the tiger always eats last. The cable industry threatens the very existence of the consumer electronics industry because of cable's stranglehold control on the set top box" (Carlson 1994). A month later the cable industry filed an FCC petition asking that Pacific Telesis (PacTel) be forbidden from offering advanced services on its proposed \$16 billion high-speed video and data superhighways. Why? Because the construction would be unfairly subsidized by telephone customers paying higher phone bills. PacTel responded, "They are trying to use the regulatory process to impede competition in their marketplace, at the same time they are trying to get into our marketplace." "This is about survival," they added (Adelson 1994).

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The European situation is similar. In this case the seminal document is the French government's *Nora-Minc Report* of 1980, which called for massive enhancement of the French network by expanding telephone penetration, the highest percentage of digital switching, and the largest packet-switched network in the world. There were parallel projects in England, which included the establishment of a new independent government agency, OFTEL, whose mission is to promote advanced telecommunications development. In Germany, the Witte Report, *Restructuring of the Telecommunications System*, was released in 1987; it was followed by the restructuring of the Bundespost and the opening of a number of markets to competition. Plans for privatization of Deutsche Telekom are progressing. By 1997, the most modern network in the world will be installed throughout the former East Germany, with the hope that this advanced information infrastructure will rapidly raise the living standards and the quality of life of people in the region.

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The MIT Commission on Industrial Productivity (Dertouzos 1988) studied manufacturing and trade from 1971 to 1987. The commission documented the decline and noticed that by the end of this period, a significant negative balance of trade existed in all but two. Even though the United States has continued to perform well in software and services, many consider the semiconductor to be the engine of the information age. The decline of American participation in memory chips is among the most dramatic. Prestowitz (1988), for example, reports that in only seven years (from 1980 to 1986) the United States and Japan literally traded places. In 1980, the United States had 75 percent of the market, whereas Japan had 25 percent. By 1986, Japan had 65 percent, the United States had 28 percent, with Europe and the Pacific rim manufacturers holding the balance. For memory chips, Japan dominated 92 percent of the market (Ferguson 1988) although Intel and other U.S. producers dominate high value-added markets for central processors and other chips. Perhaps the most significant fact of all is that national per capita income in the United States has been stagnant since 1973. Although we do not want to pursue this further here, it is worth keeping in mind as we consider how to move the nation forward with new rules of the game for the information economy.

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manufacturing firms increasingly depend on the swift movement of information from headquarters to factories to distribution points to customers in order to remain competitive with their domestic and foreign rivals. This transformation has heightened the importance of telecommunications to the nation's economic and social welfare. Many now believe that the telecommunications infrastructure will be as important in the future as the transportation infrastructure has been to the industrial economy. (National Telecommunications and Information Administration 1990, p. 5)

There is a concern, however, that our telecommunications infrastructure is less than it should be.

### The Davidson-Selwyn Debates

William Davidson of the University of Southern California filed reports with the FCC and NTIA documenting that "while the United States has been a leader in many aspects of public telecommunications, its lead has narrowed or disappeared altogether in a number of critical areas." He noted that the United States trails France, Canada, the United Kingdom, and even Hong Kong and Singapore in digital switching of local-exchange service. He found that total U.S. investment in public infrastructure actually declined in the late 1980s, and that levels of sustained infrastructural investment in the United Kingdom, Japan, Switzerland, and Germany exceed U.S. levels by 50 percent to 150 percent (1990a). His work is supported by the Regional Bell Operating Companies and is frequently cited as evidence of the need for regulatory relief for the public-switched network.

Veteran analyst Lee Selwyn and his colleagues at Economics and Technology, Incorporated, writing for the International Communications Association and representing the telecommunications user community, are skeptical. They utilize different measures of system performance and different exchange rates for the calculation of relative infrastructure development and conclude that the United States remains far ahead of the pack. Davidson responds that their numbers are out of date, contending that they ignore the downward trend and that Selwyn's exchange rate calculations distort the national comparisons (Montgomery, Selwyn, and Keller 1990).

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In a less stark scenario, we may find that the 1996 act provides for a modest step forward and, despite the efforts of some industry stalwarts, the technology prevails. The local-exchange companies lose their battle against bypass. Local television and radio broadcasters lose their local monopolies as satellite and terrestrial spectrum, coaxial, twisted pair, and fiber wireline each come to offer equivalent services.

There are three problems with this version of the future. First, it significantly delays the development of an advanced, programmable network, with the attendant disadvantages to economic efficiency and productivity. Second, it builds an interoperable network out of pieces explicitly designed not to work that way, leading to inefficiencies and operational awkwardness. Third, and perhaps most important, policy gridlock threatens to hold U.S. companies back from the cutting edge, and effectively abandons the field of integrated communications to Europe and Japan.

The Japanese, on the other hand, have a well-integrated game plan. They have harnessed the Japanese *zaibatsu* tradition, involving a complex pattern of intercompany cooperation and competition, with dramatic success. In Japanese culture, it is a strongly held belief that because the nation is small and relatively poor in natural resources, it must have a highly coordinated and aggressive strategy for economic survival in an increasingly competitive global economy.

The Europeans also have a game plan. It is even more complex than Japan's because it involves the painful economic reorganization of a weak, fragmented array of countries into the largest, most powerful unified economic and political entity in world history. It had a rocky start and has taken decades to develop, but the direction of European integration is no longer questioned. However different the Japanese and European approaches are, one thing is clear: Both heavily emphasize the strategic importance of communications infrastructure to economic productivity.

Does the United States have a game plan? Throughout the Reagan and Bush administrations, the traditional U.S. aversion to industrial policy led to a pronounced and public disavowal of any such thinking (Seib 1990). Behind the scenes, however, there was active discussion between the public and private sectors as white papers were drafted and conferences organized. The format reflected the traditionally stealthy U.S.

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This is not to minimize the importance of the Clinton administration's leadership in initiating public discussion (and cross-agency dialogue) on information infrastructure issues. The administration's initiative energized industry and motivated governments worldwide, as well as at the state and local level, to consider how new networking technologies and services might affect them and their constituencies. Combined with the federal re-engineering initiative, the National Performance Review (also chaired by Al Gore) may lead to a more responsive, efficient, and connected federal government, which in turn may be a legacy of the Clinton administration's National Information Infrastructure initiative.

### **A Case Study in Political Economics**

Political economy is the interdisciplinary study of the interaction of political and economic systems. Much of the work in this field focuses on how market failures of various sorts may require explicit intervention of the polity to protect the environment, provide a social-welfare safety net, constrain monopolistic practices, and so on. From another direction, scholars may study how economic incentives and influences distort an otherwise open process of political decision-making.

This book is a study of a historical transition currently in process as an array of communications industries, once largely regulated and monopolistic in structure, move into an era of deregulation and competition. It represents rich soil for the political economist. One can draw on an extensive theoretical base and a diverse collection of historical parallels and contrasts to better understand the current policy debate. One can also contribute to the developing theory by means of a close examination of a particularly dramatic case. We will try to do a little of each.

To put our position in perspective, we draw on the vocabulary of international relations, which organizes much of its scholarship over the last century around the polarities of idealism and realism. Briefly summarized, the idealists emphasize the potential of extranational institutions and international law to promote international cooperation and reduce the likelihood of resorting to military means for resolving differences among nations. In contrast, the realists—a somewhat more cynical lot—argue that international conflict is fundamentally inevitable, and

diminish the effectiveness of both, while dramatically slowing the pace and reducing the incentives for technical progress. We use the word “halfway” to characterize the mixed nature of these proposals; most of the proposals and analyses we have seen thus far appear to fall into the halfway trap. Halfway proposals by design reach but halfway to their conflicting goals. They are trying mightily to untie the Gordian Knot one strand at a time, and it will never work.

The policy gridlock must be addressed dramatically by means of a clear and distinct policy initiative. Such an initiative posits that regulators are ill-equipped to micromanage such fast-moving technical developments. It also posits that industrialists, who for the most part have enjoyed a century and a half of near-monopolistic profitability, will do everything they can to recapture and monopolize the new network structure. Some media executives seem to perceive it as something akin to a natural right, others perhaps simply as sound business practice. In any case, the *laissez-faire* approach of leaving the transition to market forces alone is a recipe for disaster.

There is a role for proactive government involvement in managing the transition from a regulated system to one that is truly competitive. But policymakers must abandon the regulations on entry and exit, on prices, and on mandated services at the outset, and focus on nurturing and protecting meaningful competition.

### **Open Communications Infrastructure**

Because this study draws together historical and economic analysis and presents explicit advocacy of a particular position in the communications policy domain, it seems appropriate to signal where we are headed at the outset. In the spirit of the communications field, where power is measured by the obscurity of one’s acronyms, we feel compelled to develop an acronym that captures the character of our argument. In public presentations over the last several years we have come to rely on the phrase “Open Communications Infrastructure.” “Open” captures the spirit of our call to move quickly away from a regulated common-carriage system to a competitive, privatized, interconnected system of systems. Our proposal would reflect a traditional and conservative slant if we went no

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Common carriage, as we have noted, puts both federal and local government in the role of arbiter of rates, guarantor of universal service, and general overseer of means and methods. It is a delicate and often frustrating mechanism for both parties—the regulators and the regulated. The system infrastructure is horrendously complex, and regulators are heavily dependent on information provided by the communications companies to determine rules and tariffs.

The public-trustee model derives from the American experience in private broadcasting. The logic dictates that private vendors in limited competition can provide better service than can a publicly managed system. Because the spectrum is a public resource, however, in order to maintain their access to it, broadcasters would need to demonstrate their responsiveness to the public "interest, convenience, and necessity" at regular intervals. For much of the history of American radio and television broadcasting, station managers conducted pro forma audience surveys, filled out forms about news and public affairs programs, ran editorials, and kept technical logs as part of a sham process of oversight. Virtually no stations lost their licenses for failing to serve the public interest. A few had their licenses revoked for illegal behavior and blatant disregard of technical regulations. But the public-trustee tradition does provide a model for content regulation, as regulators keep a close eye out for violations of decency, political access, and right-of-reply regulations. It is a curious mix of legally limited competition, based on the presumption of spectrum scarcity, cyclical bureaucratic attention to content rules of varied vintage, and a codified disregard for the underlying economics. Proponents of deregulation are unlikely to tout the public-trustee concept

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tivity and interoperability, incentives in innovation shift from trying to protect licensing revenues (by means of a proprietary technical communications standard or inherited spectrum allocation) to encouraging economies of scale in efficient manufacturing and service provision.

2. *Open access.* The currently dominant model of communications economics is based on a presumption that limited spectrum and inefficiencies of the competitive provision of wireline communications services require legal barriers to competitive entry and regulatory oversight of the legally designated monopolists. This premise, however, is outmoded. The critical turning point occurred first in voice telephony, and will occur soon in radio and in video. Ironically, we see the turning point first in Eastern Europe and the developing world, where the need for building telecommunications is most urgent. Wireless access to the local loop, in many cases, turns out to be fully competitive with wireline provision, but the use of wireless access to the network has other properties, especially in cellular and microcellular applications.

The critical property, we argue, is the lack of steep economies of scale in service provision. To offer universal wireline service from the outset, one must wire every street on every block. To offer cellular service, one can start on a small scale. For fewer customers, fewer cells are required. As service demand grows, the number of cells expands gradually and efficiently, without requiring additional bandwidth. Other properties of course include the mobility and flexibility of personalized communications service. In this way, the promise of Open Communications Infrastructure is in part an unanticipated artifact of cellular and personal communications network (PCN) technology. Wireless access to the local loop makes open competition in provision of local-exchange service a meaningful prospect.

3. *Universal access.* The principal element of the landmark Kingsbury Commitment of 1913 was a horsetrade. AT&T chief executive officer Theodore Vail was willing to put the entire AT&T network under the control of federal common-carrier regulation in return for protection from further competition. Part of the deal, however, was Vail's commitment to deliver on universal service, with cost averaging; and for the most part, the system he built delivered what was promised.

The deregulation of communications at this juncture raises fears that less privileged and more remote communities will be deprived of access—that competitive provision will lead to the decline of universal service. Critics, for example, point to the deregulation of airlines and the resultant changes in the cost and quantity of service to remote areas. It is at this point, however, that the transportation-communications parallel

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104, or the Communications Act of 1996. Each week through 1994 and 1995, there would be fresh conflicting predictions that the evolving bill would succeed or become mired in legislative gridlock. But as it turns out, act or no act, policy gridlock continues. In fact, the illusion of a policy of competition and deregulation created by some of the bill's sponsors makes our arguments all the more important.

There is no doubt that the act is a landmark piece of legislation for the twenty-first century. Unfortunately, although the rhetoric is right, the rules are wrong. It regulates more than it deregulates. It delays and constrains competition rather than encouraging it. It is a landmark of micro-management. By accumulating each powerful lobby's request to tilt the playing field to their relative advantage, it inadvertently introduces a new level of government interference in virtually all forms of electronic communication. It became, in the lingo of the Beltway, a classic "Christmas tree"—a bill to which each industry group attached its own self-serving ornament.

Moreover, activists challenged the provisions for criminalization of indecent content potentially available to children on free-speech grounds within hours of the bill's being signed into law on 8 February 1996. We expect further court challenges to other elements of the act, and additional court proceedings in response to the Commission's mandates, inquiries, and findings.

The act itself is intended to "provide for an orderly transition from regulated markets to competitive and deregulated telecommunications markets consistent with the public interest, convenience, and necessity." In reality that translates into inventing a whole new class of regulations to manage the transition to deregulation. The size of the bill alone tells the real story—over 100 pages of detailed prohibitions and regulations. The term "deregulation" appears twice, the term "regulation" (or a cognate such as "regulatory"), 202 times. There are 353 specific references to the Federal Communications Commission, including 94 cases of "The Commission shall" and 30 cases of "The Commission may." There are 80 formal proceedings that the Commission must initiate.

Yet the publicly pronounced intent of the act is laudable:

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tional institutions; and prohibition of subsidy of pay phones or provision of alarm services.

## **Title II Broadcast Services**

Authorizes the FCC to grant licenses to existing broadcasters for advanced television services (HDTV) and permits the provision of ancillary (nonbroadcast) services under rules and conditions yet to be determined by the Congress and the Commission.

Requires that for-profit nonbroadcast services incur fees equivalent to that which would have been recovered if the spectrum had been auctioned.

Requires that the spectrum currently used by broadcasters for traditional transmission be surrendered for reallocation under rules and procedures to be determined by the Commission.

Relaxes but does not abolish current media concentration rules by permitting ownership of television stations by a single entity reaching no more than 35 percent of the American viewing audience, and permitting unlimited ownership of radio station groups but limiting ownership in a single market to between five and eight stations (depending on market size). Rules on ownership of multiple television stations in a single market.

Extends broadcast license terms and relaxes renewal procedures.

## **Title III Cable Services**

Continues authorization of cable rate regulation under new procedures for complaint review and accounting procedures and sets an expiration date for rate regulation in 1999.

Sets up a complex definition of "effective competition" in multichannel television provision and exempts cable providers from rate regulation if the definition is met. Direct broadcast satellite (DBS) multichannel television is explicitly excluded from the definition of effective competition.

Sets up a new category of multichannel television service called "open video systems" similar to previous video-dialtone regulations, which permit common-carriage-like provision with fewer regulations.

Exempts small cable operators from rate and cross-ownership regulations.

Permits limited telco cross-ownership of cable companies and permits telco provision of multichannel television with different regulations if spectrum or wireline facilities are used.

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Sets up Telecommunications Development Fund to promote access for small businesses, rural, and underserved urban areas.

The act consistently changes which rules apply depending on which actor is providing service. The very titles of the act reflect the different rules proposed for telephone, broadcast, cable, computer network, satellite, and public utility providers. Broadcasters (may) get free spectrum for ancillary use (including telecommunications), but telephone companies are expected to bid at auction. The rules about obscene or indecent communications via computer network are different from broadcast, from cable, and from telecommunications services. The VChip provisions apply to television, but not video over the Internet.

The act requires the Commission to make numerous decisions about the existence or absence of effective competition, the fairness of prices, possible discrimination among vendors, possible cross-subsidy between different types of communications services, the technical viability of interoperability, the physical location of telecommunications switching facilities, the character of communications content, and the impact of regulation on market behavior.

Take for example the following language of the act from Title I, Section 274, which attempts to define what is and is not permissible “electronic publishing” by a Bell Operating Company. The intent presumably is to protect new competitive entrants from the economies of scale and marketing clout of the existing telcos, but the regulatory complexity approaches the absurd:

#### **Electronic Publishing by Bell Operating Companies**

(a) Limitations.—No Bell operating company or any affiliate may engage in the provision of electronic publishing that is disseminated by means of such Bell operating company’s or any of its affiliates’ basic telephone service, except that nothing in this section shall prohibit a separated affiliate or electronic publishing joint venture operated in accordance with this section from engaging in the provision of electronic publishing.

(b) Separated Affiliate or Electronic Publishing Joint Venture Requirements.—A separated affiliate or electronic publishing joint venture shall be operated independently from the Bell operating company. Such separated affiliate or joint venture and the Bell operating company to which it is affiliated shall:

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## (c) Joint Marketing.—

(1) In general.—Except as provided in paragraph (2)—(A) a Bell operating company shall not carry out any promotion, marketing, sales, or advertising for or in conjunction with a separated affiliate; and (B) a Bell operating company shall not carry out any promotion, marketing, sales, or advertising for or in conjunction with an affiliate that is related to the provision of electronic publishing.

(2) Permissible joint activities.—(A) Joint telemarketing.—A Bell operating company may provide inbound telemarketing or referral services related to the provision of electronic publishing for a separated affiliate, electronic publishing joint venture, affiliate, or unaffiliated electronic publisher, provided that if such services are provided to a separated affiliate, electronic publishing joint venture, or affiliate, such services shall be made available to all electronic publishers on request, on non-discriminatory terms. (B) Teaming arrangements.—A Bell operating company may engage in nondiscriminatory teaming or business arrangements to engage in electronic publishing with any separated affiliate or with any other electronic publisher if (i) the Bell operating company only provides facilities, services, and basic telephone service information as authorized by this section, and (ii) the Bell operating company does not own such teaming or business arrangement. (C) Electronic publishing joint ventures.—A Bell operating company or affiliate may participate on a non-exclusive basis in electronic publishing joint ventures with entities that are not a Bell operating company, affiliate, or separated affiliate to provide electronic publishing services, if the Bell operating company or affiliate has not more than a 50 percent direct or indirect equity interest (or the equivalent thereof) or the right to more than 50 percent of the gross revenues under a revenue sharing or royalty agreement in any electronic publishing joint venture. Officers and employees of a Bell operating company or affiliate participating in an electronic publishing joint venture may not have more than 50 percent of the voting control over the electronic publishing joint venture. In the case of joint ventures with small, local electronic publishers, the Commission for good cause shown may authorize the Bell operating company or affiliate to have a larger equity interest, revenue share, or voting control but not to exceed 80 percent. A Bell operating company participating in an electronic publishing joint venture may provide promotion, marketing, sales, or advertising personnel and services to such joint venture. (D) Bell Operating Company Requirement.—A Bell operating company under common ownership or control with a separated affiliate or electronic publishing joint venture shall provide network access and interconnections for basic telephone service to electronic publishers at just and reasonable rates that

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Will the public interest in universal service be adequately protected in the act? A complicated fund for providing competitive service for regions not likely to get competition (and hence, lower rates) is embodied. But just who benefits from this—and what it does for those left out of the information revolution due to lack of money, education, or interest—is quite unclear. Assumptions that competition will lower costs without pushing margins to the razor's edge were clearly behind the grand view of the bills of the past several years, but a more compelling problem has arisen in the meantime: how does either the industry or the government finance future telecom infrastructure if carriage approaches zero cost as capacity approaches infinity, and if markets for carrying bits contract because of new technologies rather than expand. This is not conventional wisdom for conventional economics; the act may be much too late.

The questions at the moment are: (1) whether the deals struck will remain acceptable to a confused Congress and a perplexed administration during and after a particularly strident election year; and (2) whether the large long-distance firms (AT&T, MCI, Sprint) have sufficient market presence to withstand the assault from equally powerful new competitors without the albatross of obsolete plant as they enter the competitors' local market, which has a similar set of technical burdens. It is likely that a new, though perhaps not as comprehensive, bill may be crafted in the near future. If new deals cannot be struck among these companies, different arrangements will be proposed by a future administration and a different Congress. As local rates zoom where traffic remains stagnant, all sorts of unexpected anomalies may start driving new entrants and the general public to distraction. The sweet smell of success may turn sour quite rapidly unless some miracle creating new markets, new jobs, and new money appears rather quickly.

The Clinton administration, in spite of its unhappiness with provisions on cable television rate deregulation and purportedly with matters relating to universal service and attacks on freedom of speech, needed a bill to demonstrate its continued leadership in national and Global Information Infrastructure development. It felt it had to confirm its ability to work

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The lack of understanding in Congress and among the special-interest lobbying groups may be the biggest surprise of the early years of the next millennium. The delay and equivocation that will certainly emerge from lawsuits arising out of the act’s contradictory provisions cannot be avoided in the U.S. political process. While older vested interests (and the jobs they encompass) may realize they bought a devil’s bargain, telecommunications lawyers and consultants are not threatened by the legislation in any way and can look forward to a prosperous and fruitful future under any scenario.

### **The Law of Unintended Consequences**

Another likely effect of the act is that it will have significant recursive effects on technology, market development, and policy practices: the law of unintended consequences. In this, the recursive nature of digital computers themselves—that a stored-program device, as Alan Turing understood from the very beginning some sixty years ago, can define its own instructions, its own cyberspace, so to speak—are a natural outgrowth of a chaotic system under no one’s control.

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In the Internet community, it is said that “the Internet treats censorship as a broken connection and works around it.” It is important to understand that this is more than an allusion—the Internet Protocol (IP) does exactly that, and to program servers extending the route with Web software is simple—even a grade-school student can learn how. Perhaps another unintended consequence of the act is to raise the status of technical prodigies to political heroes. Who said government doesn’t know how to instill educational goals and create new jobs?

The futile attempt in the Congress to pander to an ill-informed public about the real, but far from pervasive or intrusive, dangers of on-line pornography is one pertinent example of how far congressional and press attention was removed from the critical question of whether the cross-sectoral deals struck in the act will really serve to “provide for an orderly transition from regulated markets to competitive and deregulated telecommunications markets consistent with the public interest, convenience, and necessity.”

More appropriate than the provisions of the act for governing the requirements of an information-intensive society would be a new policy framework for an Open Communications Infrastructure. This new framework would make no distinction between wired and wireless networks or between content and conduit. Only such a unified policy framework is capable of supporting social and economic needs as well as sustaining technical development in the years to come. This act falls far short of this goal.

## Conclusion

It is a perilous venture to write about communications policy when politicians, lobbyists, and the daily papers assure us that the key issues have been resolved by the new act. We think not. For, as we have argued,

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neither the myopic advocates of incremental changes to the status quo nor the breathless futurists and cyberspace libertarians have adequate understanding of Open Communications Infrastructure. One side would have us inch forward (or backward) on the information highway, the other would have us wander, lost in cyberspace without a map or any shared understanding of the rules of the road. In the following chapters we review the basis in technology, economics, and policy for our position.