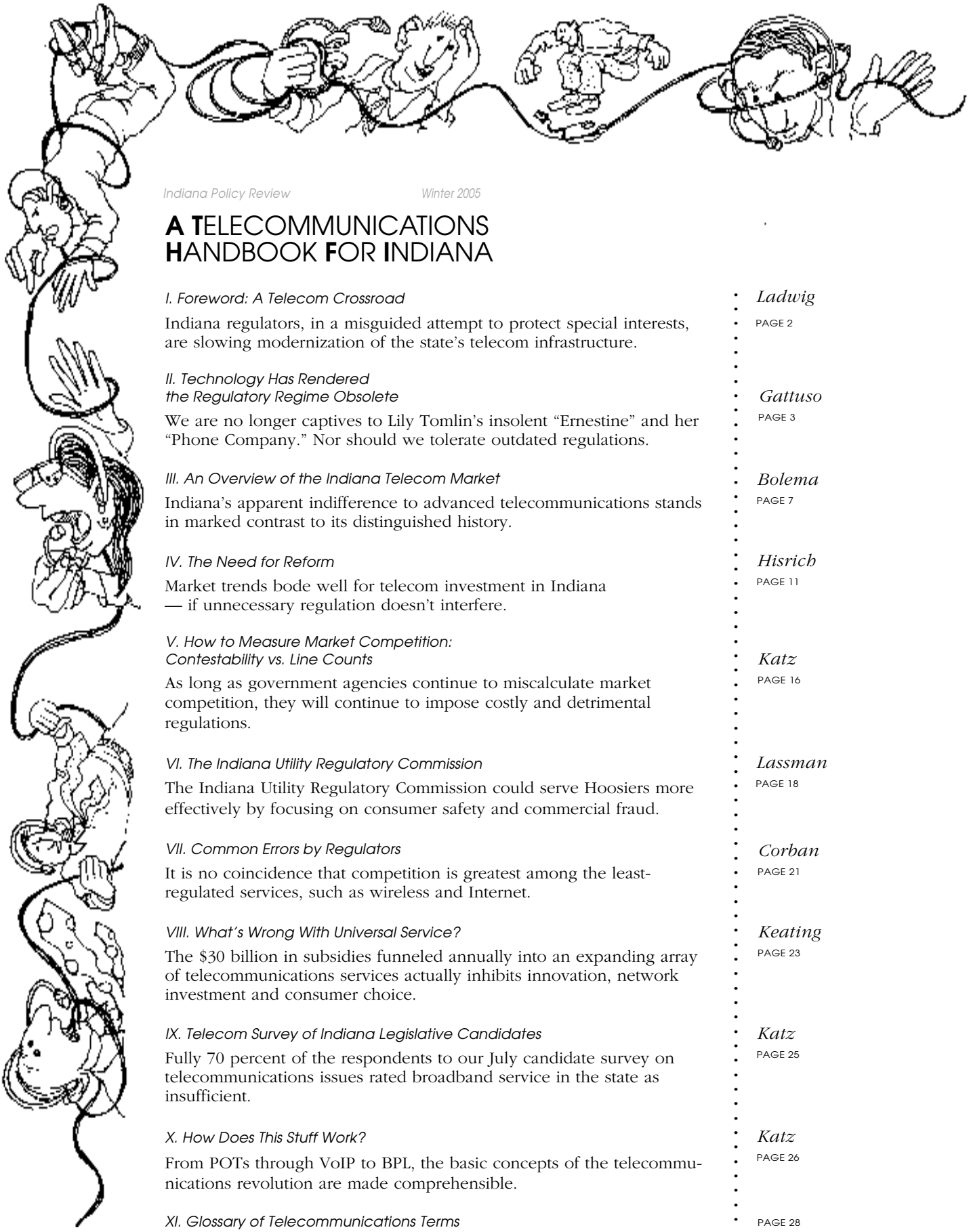


A TELECOMMUNICATIONS HANDBOOK FOR INDIANA

I. FOREWORD

Taxes, fees and regulatory mandates are keeping phone bills in Indiana artificially high.

A Telecom Crossroad

In Fort Wayne, there is a concrete-and-rebar monument to what the writers of this special issue on telecommunications are warning us about — the dangers of catering to political interests rather than heeding market forces.

Coliseum Boulevard was envisioned as a speedy "bypass" a generation ago. But by the time town fathers got through politicking over protecting even the most outdated commercial districts, the new roadway was already obsolete, overtaken by the congestion it was meant to circumvent. It now is a bumper-to-bumper highway to nowhere — an anachronism that should tell us how even the most cunning political calculations fail to keep pace with market forces.

Modern telecommunications travel along highways of a different sort, infrastructures made up of coaxial cable, DSL and Voice over Internet Protocol or VoIP. These help determine Indiana's ability to attract investment and new jobs.

Sad to say, the blueprint for Indiana's telecom highways is a law almost two decades old, one that ignores not only market forces but also innovation itself.

The state's regulatory regime of price controls, service mandates and marketing restrictions imposed decades ago stands obsolete beside the abundant, affordable telecom options available today.

A July survey by this foundation found that political pressure is building for telecom reform *(see "Candidate Questionnaire," page 25).* Of the 51 candidates responding to the survey, 70 percent rated as insufficient the level of broadband service in the state.

The level of competition in traditional telephone service likewise lags that of many other states, and the majority of survey respondents supported reform in that regard.

Moreover, only 17 percent of survey respondents approved of current rate regulation, which many economists argue deter real competition in local calling. Only 16 percent of our survey respondents supported continued regulation of local telephone rates.

"The industry is not what it was 20, 10 or even five years ago," said Republican state Rep. Eric Koch, who won reelection in the 65th House district.

Democrat Robert Threlkeld, who lost as a challenger in the 20th Senate district, agreed. "Generally, the marketplace provides the best and most efficient regulation," he said. "There is much competition in the telephone industry since both landline and wireless companies provide service."

Compared with other states, Indiana ranks a dismal 47th in the penetration of wireless services and 39th in high-speed Internet access *(see "Overview," page 7).*

Insufficient penetration of advanced telecom technologies carries significant consequences for the Indiana economy.

Of particular concern is Indiana's ranking relative to neighboring states with which it competes for economic development. Only Kentucky ranks lower in broadband penetration across the region.

Taxes, fees and regulatory mandates are keeping phone bills here artificially high. At the same time, municipalities and government-run institutions are exploiting their tax and regulatory advantages in competing against private telecommunications firms.

Indiana was once a leader in telecommunications. The world's first automatic telephone switch was installed in La Porte in 1892.

Telecom law here has not been revised substantively since 1985, and the Indiana Utility Regulatory Commission appears unwilling to adjust to even such obvious market innovations as cell phones.

To understand what a challenge that represents to the 2005 General Assembly, we must return to our bad example.

There was a reason Fort Wayne took so long to approve its bypass. It was because the town fathers tried to maintain a perfect market equilibrium.

Similarly, Indiana regulators would force us to waste time and money subsidizing outdated business models in the telecommunication industry.

If they prevail, Indiana will end up with a telecom highway to nowhere. — *tcl*

The staff thanks the Mackinac Center for Public Policy, Midland, Michigan, for the services of Diane S. Katz, who co-edited this dedicated issue on telecommunications.

GOODBYE, "ERNESTINE": COMPETITION COMES TO TELECOMMUNICATIONS

We have better options than two Dixie cups and a string

"We don't care; we don't have to. We're the Phone Company."

— "Ernestine"

by JAMES L. GATTUSO

A Telecommunications Handbook for Indiana

For many years, Lily Tomlin made audiences laugh with her portrayal of "Ernestine," the persnickety telephone operator who constantly reminded callers of their own powerlessness in the face of the Phone Company's monopoly. "We realize," she would say, "that every so often you can't get an operator. For no apparent reason your phone goes out of order, or perhaps you get charged for a call you didn't make.

"We don't care."

Then she would add, "Next time you complain about your phone service, why don't you try using two Dixie cups with a string." [1]

The routine was funny because it rang true. For most of the 20th century, telephone service was a virtual monopoly — with competition barred by law, and all long-distance service and most local service provided by the omnipresent Bell System. Unhappy consumers had no place to go.

The world today is far different. New technologies are bringing competition to nearly every facet of telecommunications. Consumers increasingly are able to choose among a variety of affordable services and providers. However, the regulatory apparatus that long sheltered Ernestine's Phone Company remains largely intact.

Unless and until these antiquated regulations are eliminated, consumers will not fully enjoy the economic and social benefits of advanced telecommunications.

Beginnings of Competition

The breakup of the monopoly telephone system began three decades ago, when MCI and others launched competing long-distance services. Competition accelerated in the mid-1980s, after the forced divestiture

The regulatory apparatus that long sheltered Lily Tomlin's insolent switchboard operator remains largely intact. Until it is eliminated, consumers will not fully enjoy the benefits of advanced telecommunications.

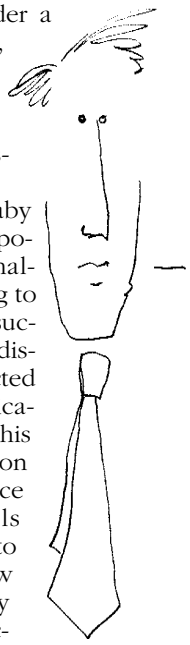
James L. Gattuso, J.D., is a research fellow in regulatory policy at the Heritage Foundation. He wrote this for the Indiana Policy Review Foundation.

AN OBSOLETE REGIME

Today, only about four in 10 new phones are wireline, a decline of 20 percent in a mere five years. By 2008, nearly 30 percent of wireless subscribers may have no wireline phone.

of the Bell System. Under a federal consent decree, local calling services were consigned to seven regional "Baby Bells," leaving AT&T as a long-distance provider.

Until the 1990s, the Baby Bells' local service monopolies were largely unchallenged. Congress, hoping to recreate the competitive success achieved in long-distance service, then enacted the 1996 Telecommunications Act. Importantly, this act permitted competition in local telephone service by requiring the Bells (dubbed "incumbents") to lease their networks to new competitors at rates set by regulators. This "forced access" was intended to jump-start competition. The effect of this regulation was mixed. Bell competitors have attracted nearly 30 million subscribers, about 16 percent of the total.[2] In Indiana, competing firms serve some 450,000 subscribers, or about 13 percent of the market. In all, competing service is available to Hoosiers in at least 73 percent of the zip codes in Indiana.



Such numbers don't tell the whole story, however. In fact, the vast majority of "competing" service is provided over the Bells' networks. Less than a quarter of the competitors actually provide their own wireline connections to consumers. Thus, real competition is quite limited.

Congress envisioned independent enterprises selling diverse products to consumers, but most competitors are merely reselling the incumbents' network services.

Put Indiana First by Ending Telecom Subsidies

Two years ago, state regulators provided MCI WorldCom and AT&T with a generous subsidy to bring about more competition in our local phone market. Competition has taken off, which is good. But, regulators went too far this month when they required SBC to continue subsidizing these long distance giants. I believe we should stop pandering to MCI WorldCom and AT&T and start putting Indiana first.

The regulatory subsidy comes as a deep discount SBC is required to provide competitors who lease its local network. Until recently, SBC's rate of $12.19 was the lowest such rate in the country. Now, SBC can charge $15.76, which means it probably has about the 42nd worst rate in the country today. The bottom line is that this isn't a sustainable economic model for a local phone company we depend on to invest in Indiana.

For me, it all comes down to three basic questions:

• *What is in the best interest of Indiana?* Although well intended, current regulations are now stifling investment and putting jobs at risk. If the subsidy ended, the nation's two largest long-distance companies would start investing in Indiana instead of getting what amounts to a free ride. Let's put economic development ahead of unnecessary handouts.

• *Do Hoosiers have communications choices?* The answer is an unequivocal 'yes.' Hoosiers have a wide array of companies competing for their business. Whether it's local, long distance, wireless or high-speed Internet access, the options are vast. Just count the number of ads in your newspaper about communications services. Or, count the number of phone companies advertising in the Yellow Pages. Choices abound and consumers are clearly in the cat bird's seat.

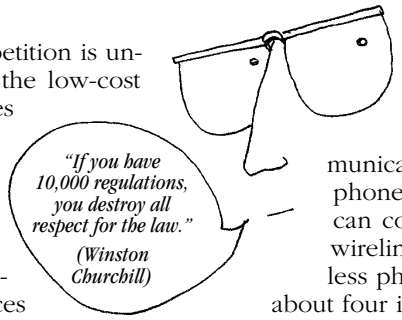
• *Would consumer rates go up if the AT&T and MCI WorldCom subsidy ended?* National pricing tells the story here. In states across the country, AT&T and MCI WorldCom charge consumers nearly $50 for a package of telecom services regardless of what they pay to lease local lines. Said another way, whether they pay wholesale prices of $15.76 (in Indiana) or $27.65 (in Maryland); they still charge customers nearly $50. Hoosiers should get a discount since AT&T and MCI WorldCom pay less to lease lines here.

State regulators were wise to re-evaluate this important issue. Unfortunately, they stopped short of ending the handouts AT&T and MCI WorldCom receive. Considering that MCI WorldCom was barred from bidding on federal and state contracts in 2003 because of past indiscretions, I think it's wrong for Indiana to reward them.

We need to end this misguided policy and put Indiana first.

— State Rep. Ed Mahern (D-Indianapolis) writing in the Jan. 18 Indianapolis Star

This Potemkin competition is unsustainable without the low-cost network access rates mandated by regulators. Moreover, there is considerable evidence that the forced access regime has inhibited investment in new services and more reliable and secure facilities. Incumbents as well as competitors have little incentive to put money into network upgrades.[3] (While a recent court decision cut back these forced sharing requirements, they are not yet eliminated.)



Wireless Telephony

Although enormous regulatory attention has been paid to these forced sharing requirements, the real explosion in telecom choice has come from technologies not even contemplated in the 1996 act. Foremost among these is wireless telephony.

Wireless phones were largely a niche product in 1996, used by only about 33 million Americans. By the beginning of this year, there were more than 158 million wireless subscribers.[4] By comparison, the incumbent companies have only 151 million wireline subscribers, a number that has dropped by nearly 17 percent in the last four years.[5] (In Indiana, there are about 3.5 million wireless subscribers, and just fewer than 3.2 million incumbent wireline telephone subscribers).[6] In terms of revenue, wireless telephone services now generate more than the wireline services ($81 million to $71 million), although wireline revenue is still higher when other sources, such as payphones, are included.

Do wireless phones compete with traditional phones? In its early years, wireless telephony was mostly just an (expensive) backup system, used when you were in your car or otherwise away from your "normal" phone. As wireless rates have dropped, however, consumers have increased their use of wireless service. Already, over 14 percent of consumers — about one in seven — view their wireless phone as their primary phone.[7] Many have cut the cord completely — about six percent of wireless subscribers have no wireline phone.[8] By 2008, according to one survey, nearly 30 percent will have no wireline phone.[9] The impact of wireless communications can also be seen in telephone sales. As late as 1999, American consumers purchased over two wireline telephones for every wireless phone they bought. Today, only about four in 10 new phones are wireline telephones. The absolute number of wireline phones purchased declined about 20 percent in a mere five years.[10]

It should be noted, of course, that incumbent telephone companies are not necessarily hurt when a consumer switches from wireline to wireless phone service. Incumbent telephone companies provide wireless service, too. Yet the wireless industry is fiercely competitive. Six or more firms in each market compete for consumers' business, most with their own networks in place. Customers switch between these providers with ease.

Internet Telephony

A second source of competition — also unforeseen in 1996 — is Internet-based telephone service. "Voice Over Internet Telephony" (VoIP) is the transmission of telephone calls over the Internet rather than through the switches and circuits that make up the traditional telephone network. In essence, it's like an instant messaging system that contains spoken, rather than written, words.

Currently, about 600,000 consumers have VoIP subscriptions.[11] That number is expected to grow dramatically in the next few years. The Yankee Group, for example, forecasts 17.5 million VoIP subscribers by 2008.[12] Some analysts are even more bullish on VoIP, arguing that it will replace wireline telephone service entirely.

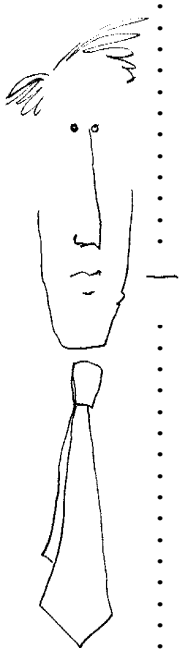
Much like wireless telephony, VoIP promises to not only present a competitive challenge to traditional phone service, but to be itself highly competitive. Currently, the VoIP market leader is an independent start-up firm called Vonage *(see page 17),* which has about half of today's customers. But many more providers — large and small — are beginning to offer the service. AT&T plans to have over a million VoIP customers by the end of 2005. Comcast is

Despite vast changes in telecom technology, rules governing forced sharing of facilities remain in place. Telephone service is subjected to heavy taxes and fees, some of which are used to subsidize some consumers at the expense of others.

Regardless of whether comprehensive government controls made sense in a world of monopoly, they certainly do not make sense in today's competitive market.

planning to offer VoIP to 40 million Americans by 2006.[13] As in wireless, the traditional telephone service providers are also stepping in with their own VoIP services. However, the traditional providers have no special market leverage. While many VoIP messages still terminate on their wirelines, they are transmitted by a variety of Internet service providers that do not rely on wholesale leasing of incumbents' network facilities.

Perhaps more important, VoIP service can be provided without using telephone lines at all. Just like other forms of Internet service, VoIP can be transmitted over nearly any high-speed ("broadband") connection. Telephone companies are by no means dominant in the market for such connections. According to government figures, about 60 percent of high-speed connections are provided over cable television lines.[14] Telephone companies provide only about a third of such connections. In addition, consumers in many areas can also choose among wireless or satellite-based broadband providers. Even local utilities may soon provide the service.[15] While the market for broadband is relatively new, it is clearly not a monopoly nor dominated by telephone service providers.



"The most may err as grossly as the few."
(John Dryden)

Despite these vast changes in telephone markets, the regulatory system that governs them has remained relatively unchanged. Rates and services remain tightly regulated by states and the federal government. Many of the rules governing forced sharing of facilities remain in place. Telephone service is subjected to heavy taxes and fees, some of which are used to subsidize some consumers at others' expense.

Regardless of whether such comprehensive government controls made sense in a world of monopoly, they certainly do not make sense in today's competitive market. Worse, they discourage investment and innovation, slowing the very advances that could most benefit consumers.

We are no longer captives to insolent "Ernestine" and her Phone Company. There is no reason we should remain captive to outdated Ernestine-era regulations that inhibit even greater telecom progress.

Endnotes

1. From SNL Transcripts at http://snltranscripts.jt.org/76/76aphonecompany.phtml.
2. Statistics on CLEC competition from Federal Communications Commission, "Local Telephone Competition: Status as of Dec. 31, 2003," June 2004.
3. Pursuant to a recent court decision, the forced sharing program is being significantly cut back. It is unclear at this point what, if any, requirements will remain.
4. Robert F. Roche, "CTIA's Semi-Annual Industry Survey," Cellular Telecommunications and Internet Association, 2004.
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7. "Landline Displacement to Increase as More Wireless Subscribers Cut the Cord," Instat/MDR press release, Feb. 25, 2004 (http://www.instat.com/press.asp?Sku=IN041644MCM&ID=895).
8. Antone Gonsalves, "Wireless-Only Subscribers Increasing," techweb.com (http://www.techweb.com/wire/26803793).
9. InStat/MDR.
10. Consumer Electronics Association, "U.S. Consumer Electronics Sales & Forecasts," (2003 and 2004 Issues).
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13. "Comcast VoIP: Says They'll Serve 40 Million Homes by 2006," Broadband Reports.com (http://www.broadbandreports.com/shownews/44652).
14. Federal Communications Commission, "High-Speed Connections for Internet Access: Status as of Dec. 31, 2003," (2004).
15. The FCC in October modified its rules to facilitate growth of such "broadband over power line" ("BPL") services.

INDIANA'S REPUTATION FOR INNOVATION IS ON THE LINE

Hoosiers must restore the policy environment that encouraged such historic inventions as the automatic telephone switch, the hand-held calculator, the high-fidelity phonograph, the jukebox and the commercial television set

by THEODORE BOLEMA

A Telecommunications Handbook for Indiana

The break-up of the Bell system two decades ago revolutionized telephone service by enabling market competition. A decade of advances in telecommunications technology represents a second revolution that, where allowed to flourish, is vastly improving both personal convenience and economic productivity.

Unfortunately, despite a history of technological leadership, Indiana now lags many other states and foreign countries in the adoption of wireless and high-speed Internet services.

Insufficient penetration of these advanced technologies carries significant consequences for the Indiana economy. As noted by TechNet, a coalition of CEOs advocating for technological innovation, "Just as rivers and ports, followed by railroads, highways and airports were once essential determiners of where companies chose to locate and where industry flourished, so, too, is access to broadband today."

Assessing the extent of advanced services in the state is a necessary first step toward improving telecom policy.

Indiana currently ranks a troubling 47th among the states in the degree of wireless penetration, and 39th in "high-speed" Internet services (broadband).

"Penetration" refers to the number of Internet lines or wireless subscribers relative to the state's population.

In Indiana, there are 2,642,810 wireless subscribers and 419,131 high-speed Internet lines among a population of 6,195,643.

Broadband in Indiana

"High-speed" Internet is defined by the Federal Communications Commission as service that sends or receives data transmis-

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"Just as rivers and ports, followed by railroads, highways and airports were once essential determiners of where companies chose to locate and where industry flourished, so, too, is access to broadband today."

— TechNet

Indiana's weak penetration rate reflects more than a quaint preference for the traditional wireline network. It represents lower productivity and a lack of technological sophistication.

sions at a speed exceeding 200 kilobits per second (kbps). Slower transmission speeds typically are inadequate for advanced applications.

Broadband service is delivered in a variety of ways. The most common type of high-speed service in Indiana today is coaxial cable (61.3 percent), which routes Internet transmissions through the same pipe that delivers cable television programming. Digital Subscriber Lines, or DSL, account for 30.8 percent of the state's high-speed service. DSL transmits signals through the copper-wire telephone network. The balance of Indiana's broadband market, about eight percent, is comprised of satellite, wireless and other customized connections.

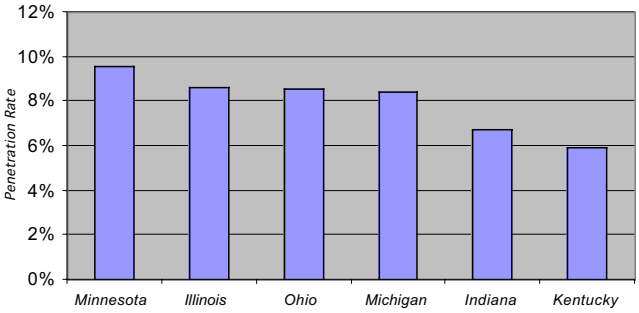
Indiana can boast of a variety of broadband service providers; the state ranks 15th in the number of firms (29). The actual number of high-speed lines relative to the state's population (6.76 percent) falls well below the national average of 9.71 percent.

Of particular concern is Indiana's ranking relative to neighboring states with which it competes for economic development. Only Kentucky ranks lower than Indiana in broadband penetration across the region.

With a lower broadband penetration rate than the national average, Indiana fares even worse when compared against international frontrunners. The United States lags 10 other countries in high-speed Internet lines, including South Korea (23.17 percent), Canada (13.27 percent) and even Iceland (11.22 percent). To the extent that unnecessary state and federal regulations impede innovation and investment, the nation is ill-served. According to Michael Powell, chairman of the Federal Communications Commission:

> (W)e will not have the information workers of the future, we will not have the health care system of the future, and we will not have the economy of the future if we don't have the platform that's designed for growth and innovation. And that platform is broadband.

Midwest Penetration of High Speed Lines, 2003



Wireless Penetration by State, 2003

State	Penetration Rank	Wireless Penetration	Wireless Subscribers	Population
D.C.	1	91.07%	513,102	563,384
New Jersey	2	67.14%	5,799,417	8,638,396
Delaware	3	66.49%	543,526	817,491
Florida	4	63.78%	10,855,430	17,019,068
Hawaii	5	61.31%	771,023	1,257,608
Maryland	6	60.26%	3,319,605	5,508,909
Wyoming	7	59.00%	295,706	501,242
Massachusetts	8	58.16%	3,741,975	6,433,422
California	9	57.38%	20,360,454	35,484,453
Georgia	10	56.88%	4,940,091	8,684,717
Illinois	11	56.77%	7,183,989	12,653,544
Virginia	12	56.15%	4,147,182	7,386,330
Colorado	13	56.14%	2,554,731	4,550,688
Connecticut	14	55.37%	1,928,988	3,483,372
Washington	15	55.08%	3,377,193	6,131,445
Louisiana	16	54.94%	2,470,146	4,496,334
Nevada	17	54.30%	1,216,838	2,241,154
North Carolina	18	54.18%	4,554,723	8,407,248
Nebraska	19	53.88%	937,184	1,739,291
Minnesota	20	52.92%	2,677,472	5,059,375
Rhode Island	21	52.72%	567,331	1,076,164
South Carolina	22	51.83%	2,149,480	4,147,152
Texas	23	51.21%	11,327,700	22,118,509
Arizona	24	50.94%	2,843,061	5,580,811
Tennessee	25	50.92%	2,974,512	5,841,748
Ohio	26	50.87%	5,817,211	11,435,798
Michigan	27	50.74%	5,114,259	10,079,985
New Hampshire	28	50.38%	648,788	1,287,687
Oregon	29	50.00%	1,778,936	3,559,596
Alabama	30	49.82%	2,242,108	4,500,753
New York	31	49.26%	9,453,613	19,190,115
Wisconsin	32	49.78%	2,723,985	5,472,299
Pennsylvania	33	49.12%	6,073,573	12,365,455
Utah	33	49.12%	1,154,992	2,351,467
South Dakota	35	47.78%	365,211	764,309
Arkansas	36	47.58%	1,296,901	2,725,714
Missouri	37	47.18%	2,691,255	5,704,484
Alaska	38	46.73%	303,184	648,818
Kansas	39	46.31%	1,261,242	2,723,507
Mississippi	40	45.99%	1,325,160	2,881,281
Oklahoma	41	45.97%	1,614,191	3,511,532
New Mexico	42	45.84%	859,408	1,874,614
Iowa	43	45.61%	1,342,931	2,944,062
Idaho	44	44.31%	605,488	1,366,332
Kentucky	45	44.02%	1,812,657	4,117,827
Maine	46	43.52%	568,195	1,305,728
Indiana	47	42.65%	2,642,810	6,195,643
Montana	48	40.75%	373,947	917,621
West Virginia	49	37.30%	675,257	1,810,354
United States		54.00%	157,042,082	290,809,777

Sources: Federal Communications Commission; U.S. Census Bureau

Wireless Services in Indiana

The number of wireless subscribers in Indiana has grown in recent years, but the state still ranks a dismal 47th nationwide, with a penetration rate of 42.65 percent. That's the lowest rate across the Midwest region.

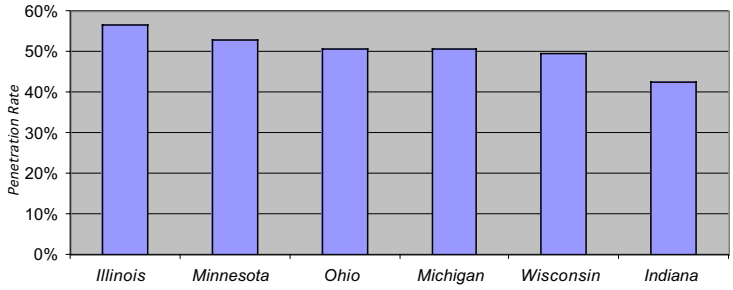
The United States as a whole also trails most other developed countries, with a wireless penetration rate of 54.3 percent, or 26th among the 30 member countries of the Organization for Economic Cooperation and Development.

Today's wireless devices feature applications well beyond local and long-distance calling. These devices, capable of transmitting video and data, effectively serve as portable Internet connections (albeit limited). Thus, Indiana's weak penetration rate reflects more than a quaint preference for the traditional wireline network. It represents lower productivity and a lack of technological sophistication.

Voice over Internet Protocol (VoIP)

Voice over Internet Protocol, or VoIP, generally refers to calls transmitted over the Internet rather than through the traditional copper-wire telephone network. Nearly all

Midwest Wireless Penetration Rates, 2003



of the major cable and DSL providers have either launched VoIP services or have announced plans to do so. The number of subscribers is forecast to increase exponentially in the near future.

VoIP has been tested for years, but it was not commercially viable as long as the service required a third-party to digitize the sound waves of voice for transmission and to reconvert the digital signal to voice at the termination of the call. With broadband, however, this conversion can now be readily accomplished at little cost. VoIP service is currently priced at about $40 per month — and falling.

VoIP offers an amazing convergence of audio, video and text applications. But absent widespread penetration of broadband, Indiana will be unable to exploit the benefits of the most advanced telecom services.

Policy Implications

Indiana's low rankings in broadband and wireless technologies indicate indifference to sound telecom policy. While state government should avoid direct interference in the market, the Legislature can and should eliminate tax and regulatory barriers that inhibit telecom investment and innovation. According to TechNet, "While the private sector should drive deployment of a next generation broadband network, policymakers, and, in particular, state governments, have a major role to play in achieving this goal."

Among the most significant obstacles are municipal rights-of-way policies that delay deployment and increase service costs. Municipalities too often exploit their authority by imposing unreasonable "fees" on service providers. Investor uncertainty also is problematic. Federal and state regulators are threatening to impose price controls, access requirements and marketing mandates on wireless and broadband technologies. California regulators, for example, already have announced their intention to regulate VoIP, while Minnesota is appealing a recent court decision that blocked the state from imposing new regulations. Other states, including Michigan, also have opened regulatory proceedings.

In contrast, Florida has opted to protect VoIP from government interference. Indiana would do well to follow the Sunshine State's lead, which would help to attract telecom investment and spur economic growth.

Conclusion

Unlike the present day, Indiana was once a technological leader. As noted elsewhere in this special issue, the world's first automatic telephone switch was installed here.

The state also launched the electric arc light; mass production of motor wire; the first hand-held calculator (the "Bomar Brain"); the self-contained washing machine; the self-measuring gas and oil pump; the high-fidelity phonograph; the Odyssey video game system; the jukebox; and the commercial television set.

Indiana's apparent indifference to advanced telecommunications stands in marked contrast to its distinguished history. Not only does this indifference undermine Indiana's proud legacy, it undercuts the state's competitiveness and economic well-being.

Only Kentucky ranks lower than Indiana in broadband penetration across the region.

State Ranking of Broadband Penetration, 2003

State	Penetration Ranking	High-Speed Penetration	High-Speed Lines	Population
D.C.	1	15.74%	88,683	563,384
Massachusetts	2	14.29%	919,638	6,433,422
New Jersey	3	12.81%	1,106,541	8,638,396
Connecticut	4	12.76%	444,525	3,483,372
New York	5	11.79%	2,262,804	19,190,115
California	6	11.74%	4,165,658	35,484,453
Florida	7	11.67%	1,986,938	17,019,068
New Hampshire	8	11.59%	149,180	1,287,687
Rhode Island	9	11.36%	122,255	1,076,164
Alaska	10	11.06%	71,778	648,818
Nevada	11	11.04%	247,442	2,241,154
Washington	12	10.96%	672,247	6,131,445
Oregon	13	10.69%	380,507	3,559,596
Georgia	14	10.68%	927,398	8,684,717
Maryland	15	10.49%	578,004	5,508,909
Kansas	16	10.46%	284,911	2,723,507
North Carolina	17	10.02%	842,130	8,407,248
Nebraska	18	9.98%	173,524	1,739,291
Virginia	19	9.70%	716,839	7,386,330
Arizona	20	9.61%	536,465	5,580,811
Minnesota	21	9.60%	485,839	5,059,375
Colorado	22	9.35%	425,431	4,550,688
Wisconsin	23	8.93%	488,620	5,472,299
Texas	24	8.70%	1,924,664	22,118,509
Illinois	25	8.60%	1,088,770	12,653,544
Ohio	26	8.55%	977,886	11,435,798
Delaware	27	8.44%	69,010	817,491
Michigan	28	8.42%	848,837	10,079,985
Louisiana	29	8.20%	368,528	4,496,334
Oklahoma	30	8.16%	286,510	3,511,532
Tennessee	31	8.07%	471,341	5,841,748
Pennsylvania	32	7.85%	971,170	12,365,455
Alabama	33	7.83%	352,215	4,500,753
Missouri	34	7.70%	439,067	5,704,484
Maine	35	7.60%	99,200	1,305,728
South Carolina	36	7.50%	310,906	4,147,152
Vermont	37	7.22%	44,724	619,107
Utah	38	6.93%	162,905	2,351,467
Indiana	39	6.76%	419,131	6,195,643
Iowa	40	6.50%	191,464	2,944,062
Kentucky	41	5.90%	243,005	4,117,827
Idaho	42	5.89%	80,455	1,366,332
Arkansas	43	5.80%	158,197	2,725,714
West Virginia	44	5.58%	100,937	1,810,354
North Dakota	45	4.98%	31,571	633,837
Wyoming	46	4.95%	24,818	501,242
New Mexico	47	4.89%	91,736	1,874,614
Montana	48	4.28%	39,240	917,621
Mississippi	49	4.04%	116,495	2,881,281
South Dakota	50	3.74%	28,557	764,309
United States		9.71%	28,230,149	290,809,777

Sources: Federal Communications Commission; U.S. Census Bureau

Indiana's low rankings indicate indifference to sound telecom policy. The Legislature should eliminate tax and regulatory barriers that inhibit telecom investment and innovation.

Broadband and Wireless Penetration, 2003
(U.S. ranking compared with other OECD countries)

Broadband Rank	Country	Broadband Penetration	Wireless Rank	Country	Wireless Penetration
1	South Korea	23.17%	1	Luxembourg	106.05%
2	Canada	13.27%	2	Italy	101.76%
3	Iceland	11.22%	3	Iceland	96.56%
4	Denmark	11.11%	4	Czech Republic	96.46%
5	Belgium	10.34%	5	Spain	91.61%
6	Netherlands	9.20%	6	Norway	90.89%
7	Sweden	9.16%	7	Portugal	90.38%
8	Switzerland	9.13%	8	Finland	90.06%
9	Japan	8.60%	9	Sweden	88.89%
10	United States	8.25%	10	Denmark	88.72%
11	Austria	6.98%	11	Austria	87.88%
12	Finland	6.61%	12	Ireland	84.47%
13	Norway	5.39%	13	Switzerland	84.34%
14	Germany	4.84%	14	United Kingdom	84.07%
15	Spain	4.24%	15	Belgium	78.56%
16	France	4.13%	16	Germany	78.54%
17	Portugal	3.72%	17	Greece	78.00%
18	United Kingdom	3.63%	18	Netherlands	76.76%
19	Italy	2.84%	19	Australia	71.95%
20	Australia	2.65%	20	France	69.59%
21	Luxembourg	2.32%	21	South Korea	69.37%
22	New Zealand	2.07%	22	Slovak Republic	68.42%
23	Hungary	0.93%	23	Japan	67.96%
24	Ireland	0.41%	24	Hungary	67.60%
25	Czech Republic	0.28%	25	New Zealand	62.82%
26	Mexico	0.28%	26	United States	54.30%
27	Poland	0.21%	27	Poland	45.09%
28	Turkey	0.06%	28	Canada	41.68%
29	Greece	0.02%	29	Turkey	40.84%
30	Slovak Republic	0.01%	30	Mexico	25.45%

Sources: OECD; International Telecommunications Union

Sources

1. "The State Broadband Index," Analysis report for TechNet, July 17, 2003, p.7, available at http://www.technet.org/resources State_Broadband_Index.pdf.

2. Federal Communications Commission, "High-Speed Services for Access: Status as of Dec. 31, 2003," Table 7, available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0604.pdf.

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4. "The State Broadband Index," Analysis report for TechNet, July 17, 2003, p. 6, available at http://www.technet.org/resources/State_Broadband_Index.pdf.

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6. Vonage Holding Company *vs.* Minnesota Public Service Commission, et al. (2004), http://www.nysd.uscourts.gov/courtweb/pdf/D08MNXC/04-00573.PDF.

7. See, *e.g.,* Diane S. Katz, "Lansing Bureaucracy Threatens New Communications Technology," Mackinac Center for Public Policy, July 14, 2004, available at http://www.mackinac.org/article.asp?ID=6690.

Accomplishing the Impossible

To illustrate the difference between the innovator and the dull crowd of routinists who cannot even imagine that any improvement is possible, we need only refer to a passage in Engels' most famous book. Here, in 1878, Engels apodictically announced that military weapons are now so perfected that no further progress of any revolutionizing influence is any longer possible: 'Henceforth all further (technological) progress is by and large indifferent for land warfare. The age of evolution is in this regard essentially closed.' This complacent conclusion shows in what the achievement of the innovator consists: He accomplishes what other people believe to be unthinkable and unfeasible.

Those fighting for free enterprise and free competition do not defend the interests of those rich today. They want a free hand left to unknown men who will be the entrepreneurs of tomorrow.

— Ludwig von Mises

INDIANA TELECOM RULES SEEM OBLIVIOUS TO TECHNOLOGY

The trick will be untangling the regulatory chains on innovation

by MATTHEW HISRICH

A Telecommunications Handbook for Indiana

Long ago, Indiana was a world leader in telecommunications. The first automatic telephone switch was installed in La Porte on Nov. 3, 1892. Almon B. Strowger, an undertaker convinced that operators were diverting calls to his competitors, devised a system to route calls among La Porte's 99 lines without interference from the switchboard "girls." A brass band accompanied the historic installation.[1]

Today, Indiana trails 22 other states in the number of high-speed Internet connections,[2] and lags 20 states in the number of wireless subscriptions[3] despite ranking 14th in population. A significant factor in this weak showing is regulatory policies that inhibit innovation and investment.

Absent reform, the Hoosier state will fall further behind. Job creation and economic growth will suffer as businesses locate beyond its borders and citizens lose access to the most advanced technologies.

Opportunities for Reform

The regulatory process always trails the pace of technological change. In the case of telecommunications, the regulatory regime of price controls, service mandates and marketing restrictions imposed decades ago has been overtaken by the abundant, affordable telecom options available today.

There is, therefore, considerable opportunity to improve telecommunications policies at both the state and federal levels.

At the federal level, the rules governing competition in local calling over the traditional wireline network were recently overturned. The U.S. Circuit Court of Appeals in Washington, D.C., found them arbitrary and overreaching. The court's decision opens the way for much-needed reform.

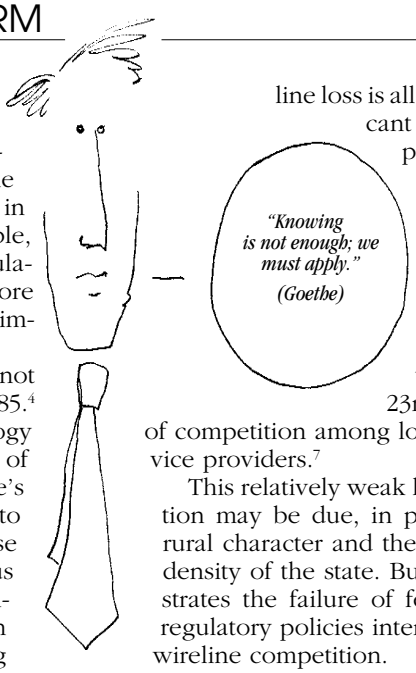
Telecom law in Indiana has not been revised substantively since 1985. Yet telecommunications technology has undergone tremendous leaps of progress that render the state's telecom law obsolete.

Matthew Hisrich is a policy analyst with the Buckeye Institute for Public Policy Solutions, a fellow member of the State Policy Network.

THE NEED FOR REFORM

Lawmakers assumed wrongly that once new entrants gained market share, they would use their earnings to build facilities of their own with which to compete against the incumbents.

At the state level, negotiations on rates and service requirements between the Indiana Utility Regulatory Commission (IURC) and the "Baby Bells" are slated to begin in January. While seemingly flexible, these so-called "alternative regulatory plans" often constitute far more restrictive regulations than are imposed in many other states.



Telecom law in Indiana has not been revised substantively since 1985.[4] Yet telecommunications technology has undergone tremendous leaps of progress that render the state's telecom law obsolete. Resistance to reform will run strong among those with a vested interest in the status quo. But enhancing consumer benefits and technological innovation matter far more than preserving regulators' powers or special-interest advantages.

The Status of Competition in Indiana

Millions of Indiana consumers now enjoy significant choice in telecom services as a result of technological advances. It is notable that the greatest growth in market share has occurred among the least regulated products and services.

Wireless subscriptions in Indiana have doubled in just four years, increasing from 1.3 million in 1999 to 2.6 million in 2003.[5] At this rate, there will be more wireless subscribers than wirelines in the state by the close of 2006.

During the same four-year period, there has been a marked decline in the number of wirelines in Indiana, falling from 3.7 million in 1999 to 3.6 million in 2003.[6] The line loss is all the more significant given the state's population increase of more than 115,000 in that time. And while Indiana ranks 14th nationwide in the number of wirelines, it ranks 23rd in the degree of competition among local wireline service providers.[7]

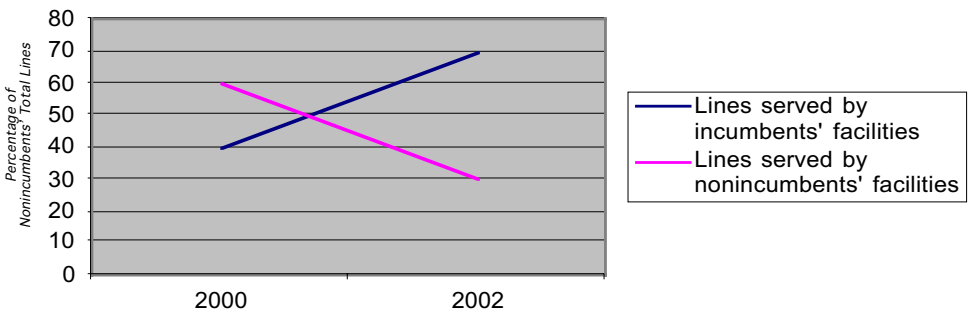
This relatively weak level of competition may be due, in part, to Indiana's rural character and the low population density of the state. But it also demonstrates the failure of federal and state regulatory policies intended to increase wireline competition.

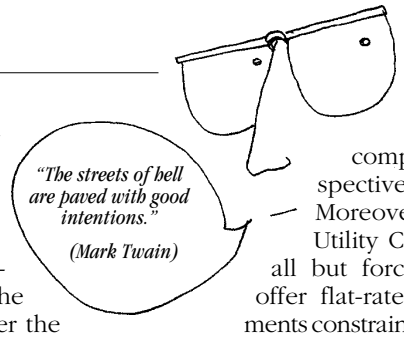
In fact, local wireline companies have actually increased their dependence on the incumbent network — precisely the opposite outcome envisioned by policymakers. According to state government data, 70 percent of the lines billed by competitors in 2002 actually were serviced in whole or in part by an incumbent network, up from 40 percent in 2000.[8]

There also has been a corresponding decline in the proportion of lines served by competitors' own facilities. Local competitors in Indiana used their own facilities to service a mere 30 percent of their customers in 2002, down from 60 percent in 2000.[9]

The intent of Congress was to allow the resale of incumbents' network services on a limited and temporary basis. The Telecommunications Act of 1996 required that the Baby Bells and other "incumbent" local

Indiana Nonincumbents Abandoning Investment in Their Own Facilities





carriers provide network access to rivals at regulated rates. In return for providing such access — and once regulators were satisfied that local competition had taken hold — the Bells were allowed to enter the long-distance market, offer cable services and manufacture equipment.

Lawmakers assumed that new entrants would need below-cost access to the network to gain a foothold in the market. And they presumed that once new entrants gained market share, they would use their earnings to build facilities of their own with which to compete against the incumbents.

Unfortunately, this regulatory approach skews investment incentives and undermines innovation. Most competitors shun investment in new facilities, preferring instead simply to resell the network services they obtain at a discount, compliments of regulatory fiat.

This flawed approach has been made worse in Indiana by the heavy-handed actions of the Indiana Utility Regulatory Commission. On wholesale pricing for network access, for example, the commission has long set rates among the lowest in the nation. Consequently, the incumbent service providers who own the network earn less revenue with which to invest in upgrades and new services, while competitors have less incentive to build facilities of their own.

Only recently, the commission raised the network access rate from an average of $12.19 per line per month to $15.76. But Indiana's rates remain among the most unsustainable among the 50 states, ranking 45th-lowest in the nation.[10]

Proponents of forced access claim that the wireline network effectively constitutes public property by virtue of the incumbents' former monopoly status. But according to data from Standard & Poor's, private investors actually have replaced the entire capital structure of U.S. telecom companies almost twice over since passage of the Telecommunications Act of 1996.[11]

Advances in technology and the concomitant changes in the telecom industry warrant a fundamental overhaul of state law. Under current law, for example, the commission has prescribed nine types of service that incumbent companies must offer irrespective of consumer demand.[12] Moreover, the Indiana Office of Utility Consumer Counselor has all but forced incumbent firms to offer flat-rate service. Such requirements constrain telecom companies from satisfying consumer preferences through the bundling of services.

In Indiana, there are nine services that incumbent companies must offer irrespective of consumer demand.

Current law also defies basic economic principles by requiring that incumbents offer their services to every segment of the market in which they are licensed. This prohibition on niche marketing robs consumers of customized calling options, while curtailing opportunities for new entrants in the market.

Incumbent firms also are prohibited from even applying for a rate increase for basic local services more than once every 18 months. (Under alternative regulatory plans, rates are capped for about three years.[13]) Such pricing inflexibility runs counter to the dynamic nature of today's telecom market.

In addition, recent events highlight a troubling tendency on the part of Indiana regulators to exceed their statutory authority. Following court rejection of federal rules on network access, the Federal Communications Commission urged incumbent service providers and their rivals to negotiate voluntary commercial agreements for network access. A statement issued by the federal commissioners characterized commercial agreements as "needed now more than ever. . . . The best interests of America's telephone consumers are served by a concerted effort to reach a negotiated arrangement."[14]

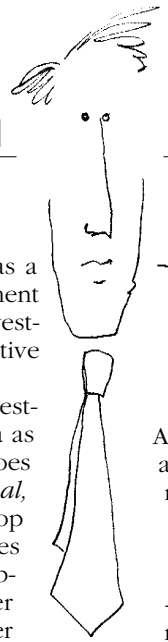
SBC Telecommunications Inc. and Sage Telecom Inc. were the first to successfully negotiate a voluntary agreement. But no sooner had the companies announced their success than the Indiana Utility Regulatory Commission demanded to review the entire agreement.

Federal law does require the Bell companies to file with state commissions all contracts as they relate to specific services delineated in federal statute.

However, state commissions have no legal authority to approve or reject contracts pertaining to a wide range of other services.

THE NEED FOR REFORM

Just when Indiana needs most to release its grip on the market, the state utility commission is appealing to the Legislature for additional powers to review mergers — beyond the authority already exercised by the federal government.



Recommendations for Reform

Indiana must regain its status as a frontrunner in technology development and implementation to attract investment and to become more competitive in the global marketplace.

Market trends bode well for investment in rural states such as Indiana as long as unnecessary regulation does not interfere. *The Wall Street Journal,* for example, reports a dramatic drop in the cost of software that enables firms to conduct business online. Web-based businesses enjoy far greater flexibility in location decisions. Lower overhead costs also allow investors to establish new ventures in rural areas, where the customer base traditionally has been considered too small to sustain a start-up. Indeed, some 2,000 new telecom firms are now offering high-speed wireless Internet access and telephone service at prices far below the incumbents.[15]

Unfortunately, the Indiana Utility Regulatory Commission appears unwilling to adjust to market realities. For example, just when the state needs most to release its grip on the market, the commission is appealing to the General Assembly for additional powers to review mergers — beyond the authority already exercised by the federal government. This attempted power grab illustrates the commission's resistance to release the market despite technological advances that have unleashed competition.[16]

Rather than augment the excessive regulatory powers of the commission, lawmakers would do well to institute the following reforms:

• *End forced access* — The growth of wireless service, cable telephony and Internet communications presents a formidable competitive challenge to wireline incumbents. Taking into account these service options, there is little justification for maintaining the forced-access regime. Service providers should be allowed to negotiate network access on mutually beneficial terms.

• *Rate deregulation* — Price controls on network access distort competition and inhibit investment. Competitive pricing would actually impose far more price discipline on firms than rate regulation. Service providers should be allowed to negotiate wholesale access rates.

• *Short of full-scale deregulation* — Access rates should be adjusted to fully and flexibly reflect the actual costs of network services. New rates must not impose the cost of subsidizing rivals on incumbent service providers.

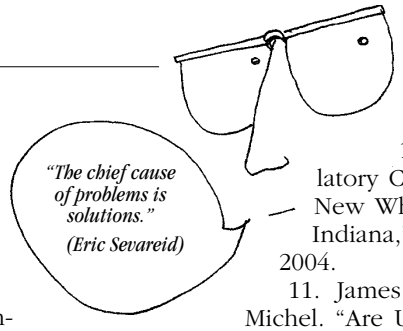
• *Avoid regulation of new services* — Encouraging innovation requires maintaining a regulatory firewall between traditional phone service and new services such as Internet telephony. Absent other regulatory changes, this approach admittedly would be unfair to traditional carriers, who are taxed in ways net-based competitors are not. But the alternative is to entangle a nascent sector of the telecommunications industry in price controls and onerous regulation. Preserving the freedom of this new sector will ultimately benefit consumers more. The best way to "level the playing field" is to reduce taxes and regulations on incumbent carriers as well.

• *Reduce taxes on wireless services* — Over the past five years, the cost of the average wireless plan has fallen more than 30 percent. However, state and federal taxes, fees and government mandates are keeping consumers' wireless phone bills artificially high. Local fees and special taxes on wireless service should be eliminated.

• *End regulatory disparities* — All providers in a competitive marketplace should be subject to the same rules and regulations. Such regulatory "parity" should be based upon reducing regulation across-the-board, rather than imposing stricter rules industry-wide. To the extent regulation is deemed essential, lawmakers and regulators should focus only on services, not on service providers.

• *Privatize government telecommunications services* — Consistent with sound budgeting, government agencies that use the broadcast spectrum should contract with the private sector to provide telecommunications services, enabling the agency to take advantage of integrated digital communications without making costly infrastructure investments of their own. Munici-

palities and government-run institutions should be prohibited from owning and operating a telecommunications service.



Conclusion

Indiana's history as a technological pacesetter was due, in part, to the absence of heavy-handed regulation. Likewise, the greatest innovations in telecom today are taking place among the least regulated products and services.

The future economic strength of Indiana requires major reform of the state's telecom policies. Most important is removing the regulatory chains that now bind the market. Indiana residents deserve to reap the rewards of such freedom.

Endnotes

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4. See Article 7 of the Indiana Administrative Code. Available at: http://www.in.gov.

5. Federal Communications Commission. "Local Telephone Competition: Status as of Dec. 31, 2003," June 2004.

6. *Ibid.*

7. *Ibid.*

8. Indiana Utility Regulatory Commission. "Telephone Report to the Regulatory Flexibility Commission of the Indiana General Assembly," Sept. 29, 2003, and Indiana Utility Regulatory Commission, "Telephone Report to the Regulatory Flexibility Commission of the Indiana General Assembly," Aug. 2001.

9. *Ibid.*

10. Indiana Utility Regulatory Commission. "IURC Sets New Wholesale Prices for SBC Indiana," News Release, Jan. 5, 2004.

11. James Gattuso and Norbert Michel. "Are U.S. Telecom Networks Public Property?," The Heritage Foundation, Washington, D.C., April 8, 2004. Available at: http://www.heritage.org.

12. These services include voice grade access to the pubic switched network; local usage; dual tone multi-frequency signaling or an equivalent; single-party service or its functional equivalent; access to emergency services; access to operator services; access to interexchange service; access to directory assistance; and toll limitation for qualifying low-income customers. Joel Fishkin, IURC, e-mail correspondence, Aug. 25, 2004.

13. *Ibid.*

14. Press Statement of Chairman Michael K. Powell and Commissioners Kathleen Q. Abernathy, Michael J. Copps, Kevin J. Martin and Jonathan S. Adelstein on Triennial Review Next Steps, March 31, 2004. Available at: http://www.fcc.gov.

15. Ken Brown and Almar Latour. "Phone Industry Faces Upheaval As Ways of Calling Change Fast," *The Wall Street Journal,* Aug. 25, 2004. Available at: http://www.wsj.com.

16. Indiana Utility Regulatory Commission. "Telephone Report to the Regulatory Flexibility Commission of the Indiana General Assembly," Sept. 29, 2003.

Encouraging innovation requires Indiana to maintain a regulatory firewall between traditional phone service and new services such as Internet telephony. At the same time, it must reduce taxes and regulations on the older carriers.

Regulations Tie Up Telecom Industry

The costs of a failed telecom policy are real: job losses among telecom providers and equipment manufacturers, and the loss of new and innovative products and services to consumers.

There is a way out of this mess. The policy of the United States in telecom should move toward deregulation, with prices being set by markets, not by bureaucrats, and with consumers, not regulators, driving service levels. The price of a given telecom service should be whatever the customer and provider can agree to, at both the wholesale and retail levels. And in this day of multiple communications technologies, if you don't like the deal being offered to you by your local phone company, you can yank the phone off the wall and go wireless.

States that want to go into this new century with telecom policies designed for the future should recognize the new telecom reality and narrowly redefine the missions of their utility commissions, which should protect consumers from real and demonstrable harm, not from imagined or potential harm. And it's time for state legislators to step up to the plate and do the job of setting telecom policy, rather than delegating the job to regulators.

— Tom Giovanetti, president of the Institute for Policy Innovation, writing in the Jan. 25 Indianapolis Star

HOW TO MEASURE MARKET COMPETITION

Contestability vs. line counts

The Federal Communications Commission's stubborn focus on counting wire lines, to the exclusion of wireless, cable and Internet telephony, wholly misrepresents market conditions.

by DIANE KATZ

A Telecommunications Handbook for Indiana

Hundreds of state and federal officials spend thousands of hours and millions of taxpayer dollars tallying the precise numbers of wire lines and traditional telephone service providers in cities large and small. This method of measuring competition in local calling drives major regulatory decisions that affect investment, job creation and service quality. Yet this type of computation is largely meaningless, rendered obsolete by a decade of dramatic advances in telecom technologies.

Defining competition solely in terms of wireline market shares is loosely derived from the federal Telecommunications Act of 1996. Seeking to eliminate local service monopolies, Congress directed the Federal Communications Commission (FCC) to regulate the incumbent "Baby Bells" based on the degree to which rivals capture market share. Consequently, the FCC and state regulators adopted the most simplistic — and erroneous — method of measuring competition, one that excludes wireless, cable and Internet telephony.

The consequences of this skewed approach are significant. By repeatedly underrating the degree of market competition, the FCC and its state counterparts secured their power to impose costly regulations that hinder telecom investment and innovation, and induce businesses to locate abroad. As it is, the United States now trails a number of Asian and European nations in deployment of the most advanced wireless and broadband services.

Whether government should even track telecom competition is certainly questionable. The widespread availability of affordable telecom options undercuts the rationale for continued regulation. But to the extent that such tracking persists, a more accurate method should be employed.

The better alternative is to gauge the "contestability" of the market. Rather than a mere tally of wire lines, a contestability analysis would determine the actual opportunities for market entry. Simply put, a contestable market is a *de facto* open market — that is, technology exists to provide services; the investment costs are recoverable; and, prices aren't likely to change in the time it takes to launch a business.

Unlike existing criteria for measuring competition, contestability would not hinge on how many firms operate at any given point in time. Nor could a contestability standard be met by the mere existence of firms created by regulatory fiat and sustained by subsidies, as is currently the case. Thus, contestability would more accurately reflect market realities, and thus curb detrimental regulation.

Diane S. Katz is director of science, environment and technology policy for the Mackinac Center for Public Policy. She wrote this for the Indiana Policy Review Foundation.

There is ample evidence that the telecom market is indeed contestable. Advances in fiber optics, wireless and other signal-processing technologies have made new network infrastructure more affordable, and new services more price-competitive.

Cellular subscriptions, for example, have increased from just 92,000 nationwide in 1984 to more than 158 million today. The number of local wirelines, meanwhile, decreased by nearly two million between 1999 and 2002.

A survey by PriMetrica and Ernst & Young found that nearly one-half of all U.S. households would switch from their primary wireline service to a "family share" wireless subscription if the contract included unlimited local calling from the home and 600 anytime minutes, including long distance, for $50 per month. An estimated 15 percent of U.S. consumers already rely on a cellular phone as their principal service.

Moreover, cable television companies and Internet Service Providers increasingly are adding telephony to their offerings. Cable telephony now serves 2.5 million residential subscribers, an increase of 70 percent annually since 2001. Voice over Internet Protocol, or VoIP, will experience a compound annual growth rate of 96.7 percent between 2000 and 2007, according to calculations by the consulting firm of Frost & Sullivan. The firm also forecasts that by 2007, over 60 percent of long-distance traffic will travel over VoIP networks.

In spite of these market transformations, state and federal officials continue to craft regulations as if consumers remain tied to Ma Bell's wirelines. Indiana's regulatory regime has not been substantively revised since 1985; the emphasis remains firmly focused on "managing" wireline competition. Consequently, the Indiana Utility Regulatory Commission continues to prescribe network access requirements, price controls and service restrictions that actually undermine telecom investment and innovation.

Resistance to reform typically runs strongest among those with a vested interest in the status quo. And as long as government agencies continue to miscalculate market competition, they will continue to impose costly and detrimental regulations. But forcing officials to measure contestability rather than count wire lines would improve matters.

The better alternative is to gauge the contestability of the market. Rather than a simplistic tally of wirelines, a contestability analysis would determine the actual opportunities for market entry.

Telecom Turnaround

Our telecom network spans the country and is operated by national companies, yet it is still regulated by 50 mini-dictators known as state utility commissions. Charged with protecting the "public interest," these busybodies have a license to micromanage every firm that's ever conjured up a dial tone. The resulting web of regulation has retarded innovation and growth.

State regulators still have the right to set local phone rates, and many exercise the prerogative by keeping prices artificially low. Phone companies are forced to make their business customers subsidize their residential customers, at the same time making enough money to reinvest in their services. Businesses simply pass their own higher costs along to consumers via higher-priced goods and services, while everyone gets stuck with stone-age phone service.

Phone companies can also be required to make annual or quarterly reports to 50 separate bodies on their revenues and assets in each state; can be subject to 50 different quality of service requirements; 50 different rules on how to send bills; and 50 different tariffing regulations. California, which has never seen a rule it didn't like, requires phone workers to wear a special badge.

A Nov. 10 Federal Communications Commission (FCC) vote exempts Vonage, and by extension other VoIP providers, from this mess. That's a blow to state regulators, who've been so eager to envelop VoIP that some states, such as Minnesota, refused to wait for the FCC and went ahead with their own VoIP regulations. The FCC ruling should invalidate those efforts, as well as any going forward.

More broadly, the vote also advances FCC Chairman Michael Powell's deregulatory agenda. The FCC chief has long argued that true competition was never going to come from giving consumers a choice between a Bell and a Bell look-alike, but from giving them a choice among different technologies — cell phones, traditional land lines, cable telephony, VoIP. . . . By declaring VoIP free of meddlesome state control from the start, and assuming victories in the inevitable state legal challenges, the FCC can now sit back and wait for the technology to grow on its own.

— The Wall Street Journal, Review & Outlook, Nov. 10

A TAFT-ERA BUREAUCRACY IN NEED OF REFORM

Consider the potential for abuse in an insular state agency with judicial powers, one that can raise its own cash through fees hidden in your utility bill

The sheer breadth of the commission's authority and the technical complexity of its regulations have long insulated it from all but a circle of highly specialized lobbyists and lawyers.

by KENT LASSMAN

A Telecommunications Handbook for Indiana

Most Indiana citizens know very little about their state's Utility Regulatory Commission. Yet this agency, with roots that stretch back to the 19th century, encroaches upon most every Hoosier's life. Greater public understanding of its inner workings is essential, both to hold commissioners accountable for their regulatory missteps and to advance much-needed reforms.

The commission is authorized by state law to regulate the provision of telecommunications, electricity, natural gas and steam, as well as water and wastewater treatment services. The sheer breadth of its authority and the technical complexity of its regulations have long insulated the commission from all but a circle of highly specialized lobbyists and lawyers.

This insularity must be overcome for two important reasons. First, the industries overseen by the agency are undergoing dramatic transformation. The commission's regulatory models, dating from the Taft era, have been rendered obsolete by 21st- century technological innovation and market competition.

Reform demands aggressive oversight of regulators by lawmakers, the media and the general public. Second, reform demands aggressive oversight of regulators by lawmakers, the media and the general public. Public demand for reform is needed to overcome political pressure from special interests who benefit from the status quo.

This is particularly the case with telecommunications. Rules fashioned to keep Ma Bell in check now inhibit deployment of broadband and advanced Internet services critical to economic growth and competitiveness in the global market.

Moreover, the subsidies granted to select sectors of the industry distort prices and thus undermine the market competition that benefits all Indiana citizens.

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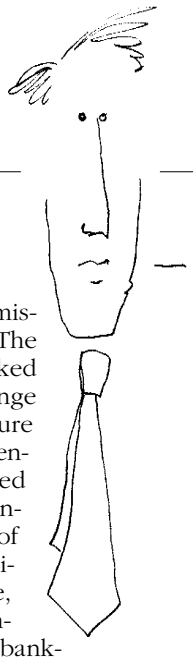


"Progress is precisely that which the rules and regulations did not foresee."
(Von Mises)

Commission History and Structure

The origin of the commission dates to the late 1800s. The post-Civil War era was marked by rapid technological change in transportation, agriculture and communications. States enacted laws and established regulatory institutions to control the rates and terms of service of industries as diverse as grain elevators, ice, insurance, agricultural commodities, gasoline, milk and banking. State railroad commissions were commonplace. In 1887, Congress created the Interstate Commerce Commission to exercise federal authority over many of these services.

What began as Indiana's railroad commission expanded over time to include oversight of natural gas, water, electricity and telephone service. In 1913, the General Assembly formally expanded the commission's charter and renamed the agency the Public Service Commission of Indiana. By the late 1900s, railroad and other transportation services were removed from the commission's purview. It was renamed again in 1987 as the Indiana Utility Regulatory Commission.

The agency is comprised of five commissioners appointed by the governor for four-year terms. No more than three commissioners at any time may belong to the same political party.

The scope of commission rulemaking is broad and varied, encompassing price controls, infrastructure investment, product marketing and service mandates. The commission also enforces some technical safety standards of the federal government.

Organizationally, the commission's professional staff is divided among eight service divisions, a general counsel's office, an external affairs division (which includes consumer complaints) and six administrative law judges. The commission is funded by a fee levied on the gross intrastate revenues of regulated firms. Despite a deregulatory trend nationwide, the size of Indiana's commission has actually increased slightly in recent years. More telling, the commission budget has increased an eye-opening 26.3 percent in the past five years, to $7.3 million in FY 2003-2004.As with most state agencies, the commission must follow administrative procedures to implement new regulations. Many originate when the commission directs the staff to investigate and analyze an issue. Thereafter, the general counsel drafts a proposed rule for commission review. Public notice of the proposed rule is posted, a hearing is convened, and comments are solicited. Following revisions, if any, to the proposed rule, a vote of the commission is taken. If adopted, the rule is forwarded to the attorney general and the governor for approval. The new rule must then be filed with the secretary of state.

The commission may also use its investigatory powers either to stay informed about developments in the market or to impose sanctions on regulated firms.

The consumer affairs division also may recommend to the commission that an investigation be initiated. Curiously, the division is authorized to publicly promote a citizen petition drive seeking an investigation by the commission.

Administrative law judges within the commission wield considerable authority. The judges convene evidentiary hearings and maintain procedural order. In a contested case between the commission and a regulated firm, the administrative law judge drafts a proposed order for consideration by the commissioners. The proposed order constitutes a legal opinion typically based on commission precedent and existing rules. On average, the judges manage between 30 and 35 cases at any given time.

The commission operates under a vague statutory charge to promote the "public interest." Without clear definition, this obligation has taken on a totemic meaning. Because regulations come from the commission, and the commission must promote the public interest, there is no need to justify how a regulation promotes the public interest. In the monopoly era, the public interest was widely understood as the availability of service to all citizens, with constant improvements in the quality of service and low rates for residential consumers — subsidized by inflated business rates, if

The Indiana Utility Regulatory Commission, whose budget has increased an eye-opening 26.3 percent in the past five years, has greatly expanded its reach under a vague statutory charge to promote the "public interest."

Commission funding is appropriated through fees imposed on regulated firms. These fees are a hidden tax undermining the growth of new services.

need be. However, the monopoly era has passed, and the marketplace is burdened with an outdated and expansive basis for regulation.

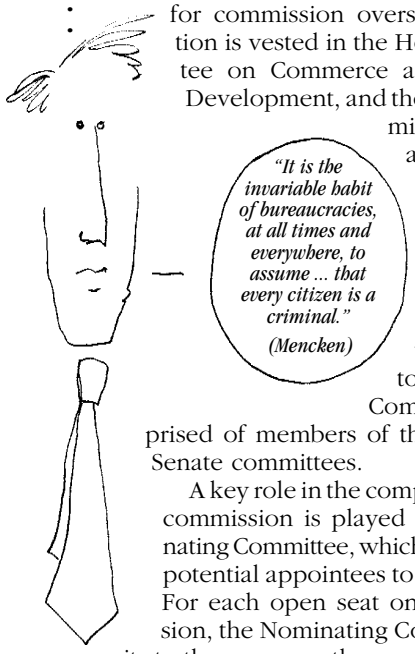
Telecommunications Regulation

A telecommunications division was created following passage of the federal Telecommunications Act of 1996. It is the commission's largest division, with 11 full-time staff. Despite the clear intent of the federal act to deregulate telecom services in favor of market competition, telecommunications activity has increased in recent years.

Under federal law, the Indiana Utility Regulatory Commission oversees interconnection agreements between telecom carriers. In the last fiscal year, the commission approved 250 such agreements. The commission also acted on 341 petitions filed on other telecom matters.

Commission Oversight and Funding

The commission was established under Title 8 of the Indiana Code. As such, the General Assembly ultimately is responsible for commission oversight. Jurisdiction is vested in the House Committee on Commerce and Economic Development, and the Senate Committee on Utility and Regulatory Affairs. During a legislative recess, the commission is overseen by an interim Regulatory Flexibility Committee, comprised of members of the House and Senate committees.



A key role in the composition of the commission is played by the Nominating Committee, which recommends potential appointees to the governor. For each open seat on the commission, the Nominating Committee submits to the governor three qualified candidates evaluated by statutorily prescribed criteria.

Unlike most other state agencies, commission funding is not appropriated from general tax revenues but rather through fees imposed on regulated firms. This presents several problems. Such fees create an incentive within the commission for expanding regulation.

That is, the greater the number of regulated firms, the bigger the budget and the more powerful the commission becomes. Moreover, because the fees are passed on to consumers in the form of higher service rates, they constitute a hidden tax that undermines the growth of new services. Finally, the commission is able to avoid the fiscal discipline imposed on other state agencies that must compete for dollars from the general fund.

Conclusions

Extensive economic regulation by state commissions is increasingly unnecessary. Technological innovation has unleashed market competition, which is far more effective than bureaucracies in ensuring reasonable prices and service quality.

This is particularly true of telecommunications. Consumers now enjoy a multitude of affordable choices, including wireless, cable and Internet-based services.

State jurisdiction also is obviated by the geographic transcendence of new communications technologies. Wireless and Internet services are interstate and global by nature, and state regulation has largely been preempted by the Federal Communications Commission. As the U.S. Supreme Court has observed, the issue "is not whether the Federal Government has taken the regulation of local telecommunications competition from the States. With regard to the matters addressed by the 1996 Act, it unquestionably has."

Technological innovation has freed consumers from the state-sanctioned monopolies of the past. Inflexible and costly state regulation no longer is needed.

The Indiana Utility Regulatory Commission could more effectively serve Hoosiers by shifting its resources from micromanaging the market to a tight focus on consumer protection against fraud. Self-preservation is a strong force within regulatory institutions. But a modernized commission would unleash investment and innovation, which ultimately would best serve the interests of all Indiana citizens.

POINTING THE RULE-MAKERS IN THE RIGHT DIRECTION

A former regulator realized that the ingenuity of customers and providers must be treated as more important than any legislative scheme

by FREDERICK CORBAN

A Telecommunications Handbook for Indiana

As a telecom regulator in Indiana for over a decade, I witnessed dramatic and unanticipated changes in both technology and market conditions. I am left to conclude that legislators and regulators, unable to divine the future, often distort prices, inhibit competition and undermine investor confidence.

Regulatory missteps, particularly of the past two decades, should be reviewed when formulating new and improved policies. Policymakers must rely more on market forces to produce a vibrant, reliable and secure telecommunications network.

Following the divestiture of AT&T in 1984, Congress and the states began to focus on developing competition in telecommunications, as well as improving public access to new technologies. Approaches varied between the individual states and the federal government. Reform was a laudable intent, but the regulatory execution often failed to achieve the policy objectives. Policymakers apparently ignored Paul Johnson's admonitions in "Modern Times" to be aware of "the law of unintended consequences."

Perhaps the First Law of Telecom Regulation ought to be: "For every regulatory action, there is a reaction — but not necessarily the one desired." To the extent we reduce regulation, we also reduce the likelihood of market distortions.

The initial promotion of competition in telecommunications services primarily involved high-volume customers. "Smart" buildings, wired for high-speed data transfer, could be connected directly with alternate suppliers. Fiber networks also were installed. But many of the alternative firms simply resold the network services of incum-

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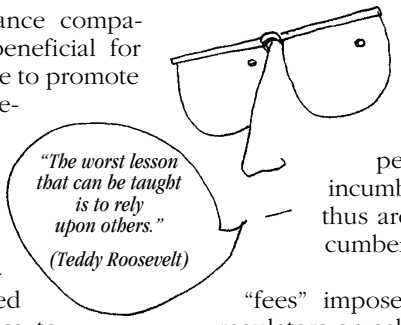
Artificially low access rates have delayed competition in wireline services; there has been little incentive for rivals to invest in independent facilities.

bent local and long-distance companies. While resale was beneficial for some customers, it did little to promote meaningful, lasting competition.



Policymakers at the time presumed that wireline services would continue to dominate telecom services. Incumbent firms thus were required to provide network access to their rivals. Policymakers also assumed that competitors would build their own network facilities once they established a customer base. Some also expected cable TV firms to add telephone services.

Pricing network access quickly became a major problem. Marginal cost was used to determine access charges, but the marginal cost of a joint-use system cannot be determined accurately.

Consider, for example, joint use in the production of chlorine and sodium hydroxide. The two products are produced in fixed ratio, but demand for the products is not fixed. Demand affects the sale price, and demand varies.

The only accurate pricing mechanism in a competitive market is for suppliers to price services to maximize total revenue, and then to compare the revenue to the total cost. This profit potential not only determines how best to operate the network, but whether or not to invest in new facilities. This was not considered in setting interconnection rates.

The unintended consequence of these access rates has been delayed competition in wireline services. There has been little incentive for rivals to invest in independent facilities when the cost of access is set artificially low. Moreover, cable TV systems did not install switching equipment because the artificial wholesale pricing made such investment uneconomical.

Meanwhile, optical fiber networks were initially deployed at an unparalleled pace. Several states subsidized such networks, while others simply encouraged deployment. Yet demand for high-speed connections lagged the forecasts, thus creating massive excess capacity that drained the bottom lines of firms across the nation. Most importantly, the greatest competition to the incumbents actually came from services that were largely ignored by regulators: wireless and Internet, principally. These technologies are far less dependent on access to the incumbent wireline network and thus are true competition to incumbents and resellers.

The variety of telecom "fees" imposed by state and federal regulators on select services also has distorted the market. Universal service fees, number portability surcharges, subsidies for the hearing impaired and the like actually are taxes masquerading as service costs. Because not all suppliers pay these fees, the result is artificially high telecom rates for some types of services.

Universal service, emergency response and handicapped access are reasonable social goals. As such, the costs should be allocated from state and federal general funds. Universal service has been a federal policy goal for some 70 years. As with most subsidies, demand for the funds has increased exponentially as the list of eligible services has expanded well beyond basic local exchange service.

Universal service taxes distributed to high-cost systems have had significant market effects. For example, by tapping the fund, high-cost telecom firms, primarily rural, are able to install new technologies sooner than rivals in larger markets.

This can be a factor in corporate location decisions, meaning that telecom firms which collect the bulk of universal service funds actually lose customers to the service providers they are subsidizing.

Federally regulated rates for originating and terminating long-distance calls also are a problem. The charges were reduced dramatically based on the same questionable method of determining marginal cost. The result was increased local service rates.

The ingenuity of customers and service providers has done far more to create a competitive telecom market than have legislators and regulators.

Policymakers must resist the urge to impose poorly considered regulations and instead use their authority to limit government interference in telecommunications to issues of safety and security.

GOOD INTENTIONS FROM THE COMMISSION OF OZ

Why do we still subsidize a phone line to Aunt Em's when it's cheaper for Dorothy to use her cell?

by BARRY KEATING

A Telecommunications Handbook for Indiana

Societies perpetuate myths to convey ideals across generations. On occasion, politicians perpetrate myths to idealize their actions. While the feats and foibles of mythical beings illuminate truths, political myths typically conceal them.

Such is the case with the pervasive cyber-mythology surrounding "universal service," which holds that our collective well-being is only a mouse-click away. We need only subsidize the wiring of every school, library, tenement and farmhouse to alleviate poverty, illiteracy and urban sprawl.

In reality, the $30 billion in cross-subsidies funneled annually into an expanding array of telecommunications services actually inhibits telecom innovation, network investment and consumer choice. Such unintended consequences are particularly problematic for Indiana and other largely rural states that would benefit most from new telecom deployment.

Among the most enthusiastic promoters of cyber-mythology has been Al Gore, who, as a presidential candidate in 1999, claimed credit for creating the Internet and pledged to speed us down the "information superhighway" (in a hydrogen-powered subcompact) to peace and prosperity.

In fact, Gore was eight years shy of his debut in Congress when the U.S. Department of Defense launched the Arpanet, the precursor of today's Web. But Gore has been influential nonetheless in preaching the transformative powers of all things digital.

The concept of universal service might seem sensible at first glance. Are we not better off with telecom services universally available at regulated rates? After all, civic and economic engagement requires a telephone and Internet access, at the very least.

A majority in Congress certainly thought so in 1996, when lawmakers significantly expanded telecommunications entitlements. The Telecommunications Act of 1996 granted schools, libraries and rural health care facilities new telecom discounts ranging from 20 percent to 90 percent, with the biggest breaks for the poorest schools and those in higher-cost areas (largely rural). In addition to subsidized services, the law provided funding for wiring, routers, servers and computers — with little regard for whether teachers could actually utilize the equipment in classroom instruction.

This wasn't the first time that politicians seized on technology as an educational breakthrough. In the 1920s, for example, radio was celebrated as a means to elevate student achievement. Schools everywhere were allocated free radio spectrum, along with a trove of equipment necessary to produce "educational" programming.

Most school-run stations went silent long ago — although my South Bend Community Schools continues to broadcast board meetings twice-monthly. But recognizing a higher use for the spectrum, the Federal

The original goal of a telephone in every home has evolved into an entitlement for advanced Internet services.

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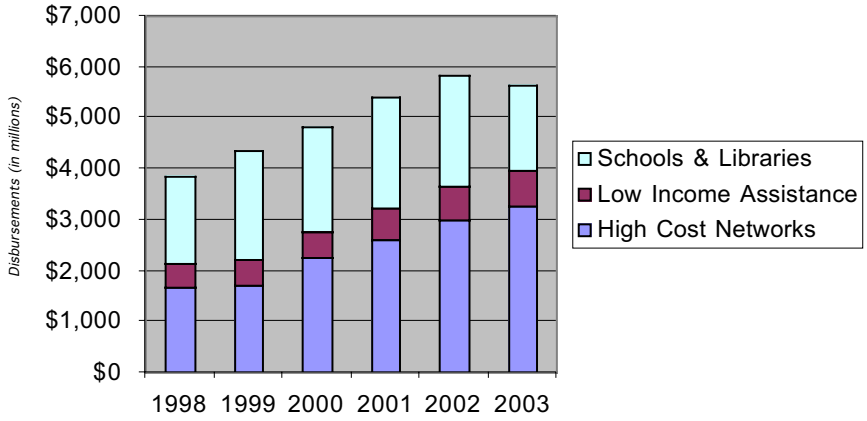
Universal Service Support



It is economically irrational to continue subsidies for costly rural wireline services for which there now exist more cost-effective substitutes, i.e., wireless technologies.

Communications Commission last year began reviewing proposals from schools and universities to sell their radio licenses for commercial use.

Prior to passage of the 1996 act, universal service subsidies were limited to basic local wireline service for low-income households and rural service providers (whose higher costs are largely a consequence of their low-density market). The lion's share of universal service funds originally was generated by artificially raising long-distance rates. But the advent of competition in the 1980s dramatically reduced long-distance rates, thereby squeezing the Universal Service Fund. A richer revenue stream was needed.

In a marked departure from past practice, the 1996 act expanded universal service eligibility to include "advanced" telecommunications services such as Internet access, and imposed new "fees" to fund the subsidies. Absent statutory reform, the subsidies may well be applied to all manner of new technologies in the future. Simply put, the original goal of a telephone in every home has evolved into an entitlement for advanced Internet services.

The chart above illustrates the ballooning of subsidies since passage of the Telecommunications Act of 1996.

Ironically, this expansion of universal service threatens to undermine the very market forces that spur innovation, and which have dramatically increased affordable telecom options. By mandating "affordable rates" for all, the federal statute and similar state laws actually stymie the ability of telecom firms to launch new services and enter new markets. Simply put, the higher rates consumers must pay to cover universal service costs crimp their disposable income and thus reduce service providers' opportunities for profit.

Today's cyber-mythology is rooted in the mistaken belief that telephone penetration across America would not have transpired without government-mandated universal service subsidies. In fact, universal service was the brainchild of Theodore Newton Vail, who, as president of AT&T, struck a brilliant deal with the feds in 1913 to provide universal service in exchange for a government-sanctioned monopoly. Up until then, hundreds of rival telephone firms were wiring the nation.

But public officials, eager to regulate the nascent industry, embraced Vail's motto: "One Policy, One System, Universal Service."

Telecommunications is hardly the only service to be judged as too essential to avoid government control. Railroads, trucking and airlines, for example, all have been regulated as common carriers. But it is noteworthy that deregulation of these same services has benefited consumers and the economy far more than government control ever did.

Universal service as a regulatory imperative has largely been rendered obsolete by the range of affordable services spawned by new technologies. Thus, it is economically irrational to continue subsidies for costly wireline services for which there now exist more cost-effective substitutes. Wireless technologies, for example, can service rural areas at much lower cost.

In an unfettered telecom market, entrepreneurs would meet demand by deploying the most cost-effective technologies rather than maintain less efficient networks for the sake of generating revenue through universal service subsidies.

The universal service myth brings to mind The Wizard of Oz. Poor Dorothy, so meek and mild, was utterly convinced that only the great and powerful Oz could possibly fulfill her wish to return home. Yet once the wizard's trickery was exposed, Dorothy realized her own power. We, too, need to pull back the curtain and recognize that universal service will not make our dreams come true. And that's a fact.

IX. CANDIDATE QUESTIONNAIRE COMPILED BY DIANE KATZ

All	*GOP*	*Dems*	*Libertarian*
1. Broadband service is sufficiently available throughout Indiana.			
14% Agree	8.6 Agree	25 Agree	12.5 Agree
70% Disagree	78.2 Disagree	58.3 Disagree	62.5 Disagree
18% Don't Know	13 Don't Know	16.6 Don't Know	25 Don't Know
2. The price of broadband service is:			
40% Too High	27.2 Too High	41.6 Too High	56.2 Too High
2% Too Low	4.5 Too Low	--	--
26% About Right	22.7 About Right	33.3 About Right	25 About Right
32% Don't Know	45.4 Don't Know	25 Don't Know	18.7 Don't Know
3. Broadband service rates should be regulated.			
11.7% Agree	4.3 Agree	33.3 Agree	6.2 Agree
68.6% Disagree	65.2 Disagree	41.6 Disagree	93.7 Disagree
19.6% Don't Know	30.4 Don't Know	25 Don't Know	--
4. Cable and telephone companies should be required to allow use of their networks by rival Internet Service Providers.			
29.4% Agree	17.3 Agree	50 Agree	31.2 Agree
43.1% Disagree	43.4 Disagree	8.3 Disagree	68.7 Disagree
27.4% Don't Know	39.1 Don't Know	41.6 Don't Know	--
5. The rates charged by cable and telephone companies for use of their networks by rivals should be regulated.			
17.6% Agree	4.3 Agree	50 Agree	12.5 Agree
58.8% Disagree	60.8 Disagree	25 Disagree	81.2 Disagree
23.5% Don't Know	34.7 Don't Know	25 Don't Know	6.2 Don't Know
6. There is sufficient competition in long-distance telephone service in Indiana.			
54.9% Agree	69.5 Agree	66.6 Agree	25 Agree
33.3% Disagree	17.3 Disagree	25 Disagree	62.5 Disagree
11.7% Don't Know	13 Don't Know	8.3 Don't Know	12.5 Don't Know
7. There is sufficient competition in local telephone service in Indiana.			
32% Agree	47.8 Agree	45.4 Agree	87.5 Agree
50% Disagree	30.4 Disagree	36.3 Disagree	--
18% Don't Know	21.7 Don't Know	18.1 Don't Know	12.5 Don't Know
8. Long-distance telephone rates should be regulated.			
11.7% Agree	8.6 Agree	25 Agree	6.2 Agree
74.5% Disagree	69.5 Disagree	58.3 Disagree	93.7 Disagree
13.7% Don't Know	21.7 Don't Know	16.6 Don't Know	--
9. Local telephone rates should be regulated.			
16% Agree	13.6 Agree	33.3 Agree	6.2 Agree
62% Disagree	54.5 Disagree	33.3 Disagree	93.7 Disagree
22% Don't Know	31.8 Don't Know	33.3 Don't Know	--
10. Telephone companies should be required to allow use of their networks by rival service providers.			
39.5% Agree	36.3 Agree	45.4 Agree	40 Agree
35.4% Disagree	31.8 Disagree	9 Disagree	60 Disagree
25% Don't Know	31.8 Don't Know	45.4 Don't Know	--
11. The rates charged by telephone companies for use of their networks by rivals should be regulated.			
26.5% Agree	22.7 Agree	50 Agree	13.3 Agree
53% Disagree	50 Disagree	25 Disagree	80 Disagree
20.4% Don't Know	27.2 Don't Know	25 Don't Know	6.6 Don't Know

The questionnaire tabulated at left was mailed in mid-July to all candidates filing for the November election with the Secretary of State. Follow-up phone calls were made two weeks later to those who had yet to respond. Out of 51 responses, 12 were from Democrats, 23 were from Republicans and 16 were from Libertarians. Responses came from candidates in four of the nine congressional races, 10 of the 24 state Senate races and 30 of the 100 state House races.

X. HOW DOES THIS STUFF WORK?

TO LEARN MORE:

Federal Communications Commission: www.fcc.gov

Progress and Freedom Foundation: www.pff.org

United States Telecom Association: www.usta.org

by DIANE KATZ

Plain Old Telephone Service (POTS) refers to the basic voice service traditionally transmitted over **the copper wire network.** The sound waves of a caller's voice are converted by the telephone handset into electrical signals that travel over the network. The copper network is prone to interference, and the signal may weaken over distance, thus requiring amplification along the way.

The copper network originally carried only **analog** signals, which travel in a continuous stream and require a dedicated circuit. But the network has been upgraded also to carry **digital** signals, which do not require a continuously open and dedicated circuit, thereby increasing network transmission capacity.

Telephone Numbers — Telephone numbers in the United States are organized according to the North American Numbering Plan. The numbering plan is administered by a private firm selected by the Federal Communications Commission through competitive bidding. The numbering plan is subject to directives from regulatory authorities in member countries.

The 10-digit numbers used in the United States consist of three separate codes that designate the route and billing of every call. Each number, when dialed or pressed, emits a tone deciphered by network computers. The first three digits, known as the area code (or Numbering Plan Area), identify a metropolitan area. The next three digits, known as the exchange (or Prefix), specify the central office from which the call is routed to a local destination. The last four digits (Station) represent the individual customer line.

Under federal law, a customer must be allowed to keep a telephone number when changing service providers within a local area. This "number portability" requires a master database to determine whether the customer line is maintained by the original service provider or assigned to a competitor.

Circuit-based Technology — Circuit-based technology, commonly referred to as "analog," relies on a dedicated, continuous transmission path through the network. A dedicated circuit is among the most reliable technologies, although it is not the most efficient in terms of network capacity.

Packet-based Technology — Packet-based technology, commonly referred to as "digital," does not require a dedicated path through the network, but instead arranges data in fragmented "packets" to speed transmission. Each packet is routed using the best network connection available at a given time, and the packets are reassembled in their original order at the destination of the call.

DSL — Digital Subscriber Line (DSL) technology enables data to be transmitted at high speeds through the copper-wire telephone network. A "transceiver" linked to a personal computer connects to the network of an Internet Service Provider through the local telephone network. Data is compressed into digital packets and routed by the Internet Service Provider to the World Wide Web.

ISDN — The Integrated Services Digital Network technology (ISDN) allows a single copper-wire telephone line to transmit both voice and data signals. Users must dial in to establish a network connection, and fees are typically assessed based on the duration of transmission. ISDN is only available within 3.4 miles of a service provider's central office.

T1 (or DS1) — A T1 line is a high-speed digital circuit that provides the equivalent of 24 voice-grade lines (or channels) of transmission capacity. The line is leased as a direct connection to a computer system, an Internet Service Provider or a destination specified by the customer. A T1 line is capable of transmitting large text files, as well as graphics and audio.

T3 (or DS3) — A T3 line is a higher-speed digital circuit that provides the equivalent of 672 voice-grade lines (or channels) of transmission capacity. The T3 line serves as the principal artery for heavy volumes of Internet traffic, including transmissions generated by corporations, universities and Internet Service Providers. The T3 is ca-

"Trade and commerce, if they were not made of Indian rubber, would never manage to bounce over the obstacles which legislators are continually putting in their way."

— Henry David Thoreau

pable of full-screen, full-motion video transmissions.

Fiber to the Home — Fiber to the Home (FTTH), also known as Fiber to the Premises (FTTP), entails replacing copper telephone lines with optical fiber cable at the user's residence to increase transmission capacity. The hair-thin strands of glass fiber carry pulses of light that deliver volumes more data at higher speeds. Transmitters are needed to convert electrical impulses from a computer into light streams.

OCn — OCn, or Optical Carrier Networks, transmit large amounts of data as light signals. The networks vary in capacity. An OC1, for example, can carry the equivalent of a T3 line. Telephone companies use OC12 systems between central offices to carry some 8,000 simultaneous conversations on a single strand of fiber.

Coaxial Cable — The coaxial cable through which television programming is delivered can also accommodate voice and high-speed data transmissions. Coaxial cable requires use of a modem to properly relay signals to the Internet and other network connections. Modem signals are first received by a neighborhood "node" that directs hundreds of such transmissions to network connections at the cable vendor's facility. Amplifiers boost signal strength along the transmission route.

VoIP — Voice over Internet Protocol (VoIP) sometimes refers to private networks that use packet-based technology to transmit calls. The sound waves of a caller's voice are digitally encoded and transmitted as packets of data. The message is decoded to voice at the destination of the call. Private networks allow users to prioritize call routing to ensure transmission speed and quality.

VoIP also refers to calls transmitted over the public Internet in order to bypass the local calling network. Unlike private networks, calls routed over the public Internet may be affected by network congestion associated with multiple users transmitting large amounts of data simultaneously. However, these technical challenges are expected to be overcome as the technology continues to advance.

Cellular Service — Cellular telephones essentially operate as two-way radios that are also capable of transmitting video and text data. Calls are transmitted as electrical signals within the radio-wave channels allocated to service providers. The signals are relayed between cellular towers that connect with switches to other networks, including the wireline network. Calls may be transmitted as analog or digital signals.

Wireless Local Loop — Wireless Local Loops use rooftop antennas rather than copper wire or optical fiber to transmit telephone calls. Unlike cellular calling, wireless local loops only provide service between fixed points. The antennas relay the signals to "hub" receivers, which interconnect with the wire line network.

Spectrum — "Electromagnetic spectrum" is the scientific term for the full range of electric, magnetic and visible radiation in the universe. Waves within the spectrum vary in size, frequency and energy, and they are classified by their wavelength. The waves can extend from one-billionth of a meter, as in gamma rays, to centimeters and meters, as in radio waves. Waves of similar length are categorized into bands. Within bands, waves travel at various frequencies. The Federal Communications Commission allocates licenses for use of specific radio-wave frequencies.

Spectrum capacity continues to expand as technology improves at delineating new frequencies and reducing interference.

WiFi — Wireless Fidelity, commonly referred to as "WiFi," is a local computer or audio network that uses high-frequency radio signals to transmit and receive data over short distances.

Satellite — Satellites operate as celestial antennas, relaying signals to and from computers to various Internet Service Providers. The transmissions are weather-sensitive and more prone to landscape interference than other technologies.

Broadband Over Power Lines (BPL) — A number of utilities are experimenting with using power lines to transmit voice and data signals. The existing wiring of homes and businesses presents opportunities for a variety of applications. Computer adapters are necessary to filter the various signals.

TO LEARN MORE:

Diane S. Katz, A Telecommunications Policy Primer, the Mackinac Center for Public Policy, http://www.mackinac.org/article.asp?ID=6750.

XI. GLOSSARY OF TELECOM TERMS

Analog — The method of transmitting voice or data as electrical signals.

Bandwidth — The transmission capacity of the analog or digital line.

Baud Rate — The speed of an analog signal.

Bits — The digits used by computers to represent data for transmission.

Broadband — Higher-speed data transmissions, typically greater than 128 kilobits per second, in which multiple signals are simultaneously sent.

Bundling — The packaging of various telecommunications services by a single provider, which may include local and long-distance calling, Internet connectivity and wireless.

CLEC — Competitive Local Exchange Carrier. A firm offering local telephone service in competition with a former Bell company or other incumbent firm.

Coaxial Cable — Wide bandwidth copper cable deployed by cable TV companies.

Compression — Maximizing the density of data transmissions to increase transmission efficiency.

Cramming — Adding telecom services to a consumer's bill without authorization.

Dialing Parity — The ability to place calls through a competing service provider using similar dialing patterns, and without requiring the dialing of extra digits or an access code.

Digital Ethernet — Light-wave transmissions arranged in binary units.

LANs — Local Area Networks. A connected set of computers and related hardware within a business or campus environment.

LATA — Local Access and Transport areas. The geographic delineation of local calling boundaries crafted by the U.S. Justice Department as a result of the AT&T divestiture in 1984.

MANs — Metropolitan Area Networks. A connected set of local computer networks.

Modulation — The conversion of analog signals to digital signals.

Multiplexing — The division of digital signals into various frequencies to allow a single line to carry multiple transmissions of voice, video and data.

Protocols — The operating rules governing communications transmitted between computers.

Slamming — Changing a service provider without customer authorization.

TELRIC — Total Element Long-Run Incremental Cost. The formula devised by the Federal Communications Commission to calculate the fees allowed for wholesale access to the local incumbent network.

Twisted Pair — The copper wire used in the standard local telephone network.

VoIP — Voice over Internet Protocol. Transmission of voice calls through Internet connections.