Building Value Through Telecommunications... or Regulatory Roadblocks on the Information Superhighway

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June 3, 1994

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Abstract: Building Value Through Telecommunications

In a global economy that is increasingly information intensive, almost everyone agrees that an advanced telecommunications network infrastructure is key to economic growth and value creation. Throughout the world there has been a flurry of government activity promoting investment in advanced telecom network infrastructures. Since public sector budgets are strained in most countries, new government policies and regulations must be targeted to stimulate private sector investment. But businesses worship at the altar of cash flow; investment incentives are directly related to the pursuit of high profits and competitive advantage. Established regulatory processes, on the other hand, continue to focus on constraining earnings and market power and, therefore, represent a formidable institutional roadblock to increased private investment, one which is sure to delay or even deny the prospect of developing an advanced public network infrastructure. There is hope, however: if governments can avoid the temptation to over-regulate the introduction of competitive entry into telecom service markets, then rapid deployment of the Information Superhighway will not necessarily fall victim to a fundamentally flawed regulatory process.

Introduction

Convergence, the compelling buzzword of the Information Age, conjures up images of combining many different communications media using a common digital communications medium. Convergence potentially allows for effortless interactive communication among people and machines, where voice, text, and images are all carried on an integrated digital Information Superhighway.

The implications of a powerful new communications infrastructure for creating added value for businesses and households is staggering. But there is a substantial barricade on the road to building value through advanced communications. It's regulation, and, in a word, it *sucks*.

It's the *Process* - Stupid!

Since many regulators are friends of mine, perhaps I better clarify this a bit. Note that it is regulation which sucks, not regulators. To coin a phrase, "It's the *process* - stupid."[1] In many, if not all, developed countries of the western world, it's the process that is sinking or at least significantly delaying the development of an advanced public communications network infrastructure.

The revealed preferences of government authorities is that they remain more preoccupied with the possibility of monopoly power and high profits in the private sector than with stimulating investment and media convergence through market-based incentives. Herein lies the most pitiful irony of the situation; the most fundamental drivers of private market investment incentives are exactly the opposite of what government

authorities are prepared to adopt in the name of infrastructure development. The solution to this problem is clear. If policymakers truly want to stimulate private investment in the public telecom network via market forces, they should do it the old fashioned way by eliminating restrictions on the market entry, profits, and the scope of operations of all market players.

In North America, telephone, cable television, and new wireless communications companies tell us that the Information Superhighway is coming, featuring universal access for all. This is the broad based consumer oriented vision often referred to in political rhetoric regarding infrastructure development. But words are not deeds. At the same time, these same companies continue to lobby for government protection of their traditional markets. The real linchpin to achieve this information age vision is the adoption of government policies which promote private investment in public network technology, not the rhetoric of private businesses, which, more often than not, are simply hyping new technology to signal their potential rivals that they will aggressively deploy the latest technology in hopes of beating competitors to the punch, or, at the very least, giving them pause in considering their own potentially redundant investments in infrastructure.

Examples of industry hype abound. Pacific Bell has announced an aggressive $15B infrastructure initiative in California to wire up households for broadband service. This comes to something over $3,000.00 per household. AT&T has announced grand plans for a national infrastructure associated with their take over of McCaw cellular. And MCI

has taken over a nationwide cellular operator Nextel, and separately announced a $20B local infrastructure effort with more to come ... and so it goes. These are not the first such announcements nor will they be the last.

Interestingly, though the market signaling that is catching all the news headlines may constitute credible threats from players with deep pockets, it is likely that the first network operator to seriously take the plunge into mass market investments will have the most to lose financially. Technology trends are making it increasingly difficult to bet on the financial prospects for capital recovery of infrastructure investments. Whether the potential to lose money is there or not, the government should encourage businesses to take the risk by freeing up market entry.

Throughout recent history a number of integrated network projects became spectacular failures but at least these are only troubled broadband market trials which can be abandoned at minimum cost. Some of the more prominent ones include: the once highly touted early trial by BellSouth in Heathrow Florida, a fiber-to-the-home trial which was a very expensive experiment indeed; the failed GTE integrated network project in Cerritos California; the US WEST/AT&T/TCI integrated network trial in Denver; and, most recently, the press has been reporting that the Time Warner "full service network" broadband trial in Orlando is having problems as well.

As standardized digital technology advances, the commoditization of public digital network distribution will become complete. At the same time, technical network alternatives of private "contract carriers" are

proliferating, fulfilling market niches and siphoning off important revenue streams from the integrated (and commoditized) common carrier network providers. Examples of cost effective private network technologies include several wireless alternatives such as private two-way satellite systems, new digital cellular networks and two-way broadcast and packet radio networks. Alternative private wireline networks also abound using digital fiber optic and coaxial cable, and various hybrid networks using combinations of wireline and wireless technologies. There is also sure to be some stiff competition to infrastructure network operators in many market segments from truly portable media such as read/write CDs, digital video and audio tapes and other computer based communication alternatives.

With such a cornucopia of private competitive network alternatives on the horizon, it is interesting to contrast this with private sector rhetoric about convergence of network infrastructure. Using buzzwords like "seamless nationwide" "high speed digital" "information superhighways", the private sector rhetoric, sometimes in response to government inquiries, would have us believe that consumers can just sit back and watch it all happen. Yet investment rates in public network technology beyond existing digital core network upgrades are stagnant.[2] The likely explanation is that all the private sector is really convinced of is that direct government involvement is the worst that could happen and anything that can be said to prevent that involvement is good for business. I, for one, would not disagree. But a truly effective policy mix will inevitably require some government intervention, not the least of which would be to tear down current barriers to competitive market entry. But is government up to the task?

Government Policymaking Processes

A historical examination of traditional institutional processes governing the communications industry could best be described as a study in the political economy of turf allocation. While the details of the process might vary by country, the general result of the process is the same. In all cases communications market "turf" in any given geographic region is allocated to monopoly providers for telephone, cable television, broadcast and, in many cases, newspapers. The monopoly provider paradigm has long been questioned and by now most countries have authorized at least limited entry of competitive service providers within a given domestic media market. But such entry is hardly open to all comers and more often than not the new paradigm is one of regulated competition rather than just plain competition. Furthermore, regulatory authorities have still failed to authorize any significant cross-market ownership where telephone, cable and broadcast companies may diversify in any given geographic area.

There are exceptions such as in the UK and Hong Kong where government authorities encourage competitive entrants to provide both cable and telecom services. Yet even in these cases, the government disallows similar freedom of operation for incumbent firms. Only through symmetric application of the rules of competitive entry may the potential for full and fair competition be realized. The prevailing asymmetric entry policies make it impossible to determine whether or not competition and open entry are sustainable, and, in any event, put any serious efforts for mass market deployment of an Information Superhighway on a relatively slow track by

keeping major players out of the game. Yet this type of market test, featuring a government policy of free entry, is seemingly essential to achieve the vision of media convergence on a mass scale.

It is high time for policymakers to bite the bullet on free market entry, for there is no more powerful engine for investment than the freedom to pursue cash flow opportunities. Barring the failed monopoly turf allocation policies of the past, there are essentially two ways for governments to try to speed up private investment in public network infrastructure: by pursuing a policy of deregulation and open market competition, which is government getting out of the way and allowing the private pursuit of profits though productivity and innovation, and government pro investment initiatives such as flexible allocation of radio spectrum, tax breaks, universal service subsidies, and seed funding for achieving a critical mass for fledgling but promising technologies. In fact, some combination of these two basic policy options could provide an extremely powerful incentive for private investment in network infrastructure.

Unfortunately, in the US, the government at both the state and federal levels practice neither of the above, choosing instead to wallow in the mire of bureaucratic gridlock. Why? The answer is simple -- it's the *process* - stupid. In other words, it is the stated government objective of increased investment that seems invariably to fall victim to the process for implementing it.[3]

At the highest levels of political discourse, everything sounds very pro-infrastructure and pro-consumer. Take the three basic pillars of the Clinton

Administration's telecom policy objectives: first, that America must remain the world leader in information infrastructure by speeding up investment through private sector incentives spurred by opening markets to competitive entry; second, that infrastructure networks must be compatible to maximize functionality and minimize the expense of interconnection; and third, that all Americans should have affordable access to an advanced network infrastructure.

I must say that, even to an economist, at this level anyway, the Administration had it just about right. So what went wrong? -- it's the *process* - stupid. The main theme of open market entry and competition is no where to be found in pending Congressional legislation. Instead, the legislation is full of onerous and very detailed rules and regulations specifying all the regulatory hurdles one must overcome to do something creative in the marketplace.

There are currently three major pieces of legislation pending in Congress and all of them combined are a model of the process of political turf allocation. In the US House of Representatives, there are two major bills pending, HR 3626 (Brooks-Dingell), and HR 3636 (Markey-Fields).[4] In the Senate there is S 1822 (Hollings) which primarily addresses issues of allowing the Regional Bell Operating Companies (RBOCs) into the long distance business.[5] The House bills concentrate on cable/telco market entry issues, and cover the conditions under which the RBOCs may provide certain enhanced services, information services including electronic publishing, and manufacturing (which the Senate Bill addresses as well).

The Senate bill S 1822 is, in no uncertain terms, an economic disaster. This legislation begins by playing up the inalienable virtues of competitive solutions to current infrastructure investment problems and then promptly switches gears to list a veritable gauntlet of rules and formal waiver processes which must be run by incumbent firms wishing to enter into one another's traditional monopoly market turf.[6]

The pending House bills are considerably less overt in their zeal to regulate competition and market entry, but are nevertheless full of details about how many hoops a firm must jump through to get the legal freedom necessary to compete in the traditional monopoly markets of another incumbent.[7] In summary, while all of the pending bills can legitimately claim, on a very broad scale, to be pro-competitive, it is painfully clear that, once the fine print is examined, none of them truly is.

At this point, the only way for politicians involved in telecom policymaking to be saved from themselves and still do the right thing, is to retreat on the details and pass rather broad and far reaching legislation mandating that market based solutions be favored in lieu of regulated competition and specifying that the FCC and the States handle the details of implementation. This would be, on paper at least, consistent with the broad policy positions of all of the industry factions. The devil is always in the detail (and the process) of specific legislation.

Regulatory barriers to entry into otherwise monopolistic markets, like those which protect local and toll telephone service providers, cable television, broadcast and print media, must be removed. The primary

artificial barrier to entry is service area franchise requirements imposed by government authorities which, although usually not legally exclusive, are made effectively so via the political turf allocation process.

While one could certainly place much of the blame for bad policy at the doorstep of political self interest, there is also a serious lack of understanding. It is entirely possible, if not likely, that many key policymakers just don't get it.

Even if an unambiguous message of market competition came out of Congress or state legislatures, state commissioners or the FCC would still have to implement it -- and on this score the outlook is dim. The Clinton Administration should appoint the most qualified people to telecom policymaking agencies rather than favoring on-the-job training for those who may be politically or demographically correct. Expertise is sorely lacking at a time when informed and principled leadership is needed most. The recent fiasco regarding the "tag team" approach with which Congress and the FCC tried to regulate cable prices is testimony to their inability to act effectively.[8]

By now the government should have learned from past well intentioned efforts to manage competition that loopholes in the rules are the norm, not the exception. Managed competition is an oxymoron, kind of like "efficient regulation". Regulators, in trying to have the best of both worlds at once, namely, regulation and competitive entry, end up getting the benefits of neither, and the costs of both. They should have taken the high road of market discipline and promoted entry.

As *The Economist* so aptly put it in its April 16th issue, "Some of this (Wall Street's) criticism is misdirected. On the one hand, the second cable price-cut may indeed be the result of a flawed rule-making process; similarly, the sight of the FCC producing reams of regulations and hiring hundreds of lawyers is certainly not comforting. Nevertheless, the FCC's job is to implement laws, however misguided, passed by Congress."

The AT&T Divestiture Court and the FCC's version of regulated competition has similarly made a debacle of the long distance market in America. Over the last several years, a dominant AT&T has done nothing but raise prices for basic long distance services; MCI and Sprint follow along in lockstep.[9] Yet the RBOCs remain specifically excluded from the market.

As usual, the smaller consumers are relative losers at the expense of industry profits and discounts for big business. AT&T, in its 1993 annual report, so much as admitted this as they touted the fact that as local exchange carrier access charge expenses continue to fall, toll rates for the mass market were increased, leading to increases in an already huge operating margin.[10] AT&T even went on to say that part of the basic toll service rate increases were used to support further discounts for the high end of the market. Who is regulated competition protecting? As much of the recent literature on this subject suggests, the answer is that regulated competition protects competitors, not consumers. While it is entirely possible that the pricing practices in long distance markets might be consistent with competitive markets, it is also likely that if there were no

barriers to entry for the RBOCs that the levels of prices could be lower and declining rather than rising.

This argument, by the way, is not solely a defense of the RBOCs, which, upon being allowed to compete in long distance markets, must agree to simultaneously submit to open, unbundled, non-discriminatory access and interconnection in the local service markets they currently dominate. The same goes for cablecos, if they want to provide two-way telephone services.

When politicians seek private sector input to help guide them in the policymaking process, the "expert" advice they get is questionable. The industry representatives invited to present Congressional testimony are businessmen, not statesmen. Their immutable goal in life is to make money, preferably at the expense of real or potential competitors. There is no way that we could or should expect private industry factions to really truly be for competition except of course if it's somebody else's competition.

Take for instance these so-called blue ribbon panels of industry experts which bureaucrats so often enlist to present recommendations for speeding up infrastructure investment. These august panels are primarily populated with the CEOs from the largest firms in the business including incumbents and entrants or would-be entrants. Their presentations in Congressional hearings, are usually little more than a carefully choreographed spectacle pleading that competition is good but that their industry constituents, as competitors, for one reason or another, need special protections because someone else has a market advantage.

Of course, it is precisely market advantage that drives the engine of economic investment in every other industry.[11] Let firms compete to build better mouse traps and you tend to get the most investment. The beauty of this market process is that consumers benefit too, because quality is higher and the price is ultimately lower.

It is unfortunate that, in the rare cases when qualified academics may be asked to present their relatively objective opinions, their testimony is given about as much weight as its value in preserving the sinecures of those that might bother to come and listen. If they had listened, the message from academics with no particular ax to grind tend to favor market processes in practice, not just in theory, where competitive capabilities determine market advantage in lieu of gaming the regulatory processes.

Anyone who doubts this should read the April 19 Wall Street Journal editorial page. The forum title, "Toward a Free Market in Telecommunications," was no where close to describing what the broad range of invited contributors had to say. The same anti-competitive and protectionist whining was the order of the day for most of the industry CEOs, while it was only some of the non-industry contributors and Vice President Gore himself that touted the virtues of market based policy reform without particular regard for favoring one industry faction over another.

The only good news on this score is that our sovereign neighbors to the north and south are no better at this process. Mexico continues to support

monopoly and duopoly provision in the case of basic telephone and cellular services. In the case of Canada, the government recently announced its version of a blue ribbon task force for information infrastructure policy, the national information highway advisory council, and its composition makes it a sure bet to end up as ineffective as that similar panels were in New York and many other states that have tried the same process. The recommendations usually handed down pursuant to the political maneuvering of the various factions is essentially a mandate to do nothing, which is roughly the recommendation that emerged recently from Albany.[12] In contrast, in the singular case of California, the regulators seem, on paper at least, to consistently opt for a free market solution to government sanctioned monopoly.[13]

There are a few other success stories, such as the focused infrastructure initiatives in Tennessee and New Jersey,[14] but these had the advantage of being driven by a combination of relatively high telephone company earnings and a favorable regulatory environment. These are rare among a number of other failures to report however, including Pennsylvania.

The bottom line is that the process of regulation, as we know it, sucks: it tears down the stage for building value by limiting a firm's ability to take advantage of market opportunities; it creates an environment of uncertainty because it can be so fickle; it hurts consumers by protecting competitors; and it hurts investment because it limits the potential benefits from innovation. On the other hand, market competition in the telecommunications sector has never been tested for its impact on consumer welfare. Should such a novel idea as open entry ever be tested in the real

world, the worst that could happen is that consumer welfare losses would materialize to the extent that a natural monopolist would emerge that sustained high mark ups of price over marginal costs. Based on the extensive literature to date, it is imperfect regulation and its attendant uneconomic price structures, not monopoly market power, that is the source of huge consumer welfare losses.[15] In the political economy of regulation, we as a society seem to simply have opted for a known bad alternative.

The basic problem inherent to the process of policy making via regulation with all of its political underpinnings was put most succinctly by a retired academic who served a distinguished career as a politically appointed State and Federal regulator. Professor Charles Stalon served on the Illinois State Commerce Commission (ICC) and later on the Federal Energy Regulatory Commission (FERC). In a policy research paper presented just after stepping down from FERC, Professor Stalon was explaining just why it was that he, and regulators generally, often rendered uneconomic decisions, even though he, as an academic economist, certainly knew better. He stated that it had to do with the fact that there were usually at least two industry factions directly involved in any pending regulatory decision and that, if a regulator wanted to keep his or her job, there was an implicit top level constraint on how one voted -- a sort of regulator's creed: 'Do no direct harm' (to any direct party to the decision).[16] In other words, a regulator could render judgments that indirectly harmed many, even many millions of ordinary consumers, so long as any particular decision did no direct financial harm to the parties to the debate. Thus, even when a regulator knows that a given decision may not be in the interests of

consumers, they must rule such that competitors are not directly harmed. This perspective is particularly revealing of the fundamental flaws of the regulatory process.

Infrastructure Costs and Capital Recovery Prospects

Lest I myself be accused of rhetorical ruminations, let us look at some estimates of the costs of modernizing a nationwide network infrastructure. Table 1 provides estimates of the average incremental costs on a per household basis for network access line digital upgrades for telephone and cable TV networks using new digital fiber optic and wireless technologies.[17] These costs were prepared by the author based on many industry sources and generally represent the consensus view. For purposes of comparison Table 1 also provides "base case" estimates of current average incremental costs of telephone and cable television company local networks using traditional analog technology.

Telephone company access line upgrade costs for narrowband ISDN are also presented. It is very useful and potentially instructive to consider the relative costs of a technology which was supposed to be here by now, but isn't, when considering the costs of that which is forecasted to come, and may not.[18]

The costs presented do not include consumer terminal gear and fancy new TV set top boxes or, in the case of cable upgrades, the additional costs of interconnecting to the intercity networks of the telcos for ubiquitous two-way services. The costs for these excluded items are potentially substantial making the costs of final service to households considerably more than the

costs of upgrading only the supplier network in Table 1. In the case of consumer terminals for integrated narrowband and broadband services the costs are similar for both telcos and cablecos and vary directly with the level of functional capability of the terminal unit (e.g., digital television receiver, set top box, computer terminal, modem, picture telephones).

The second excluded item, interconnection costs, can be substantial indeed at current tariff rates for access to the Public Switched Telephone Network (PSTN). For this reason, cablecos and other private network providers are aggressively pursuing wireless bypass alternatives and wireline direct connections to toll carriers like AT&T and MCI to achieve ubiquitous intercity service capability, as long as local cablecos could cooperate to originate and terminate calls. This is no small task considering that there are over 10,000 local cablecos in the US. Thus, for some time to come, the costs of local telco interconnection will be a very important consideration to would-be entrants.

The cost estimates in Table 1 also consider relatively new "mediumband" technologies like Asymmetrical Digital Subscriber Line (ADSL) which is capable of two-way narrowband digital service integrated with one-way "mediumband" service to support "video dial tone" and "video on demand" services (technically a 1.5Mb/s downstream channel for single channel VCR quality video service). The HDSL mediumband alternative listed is primarily for businesses to obtain two-way T1 digital services and is not contemplated by telcos as a mass market residential service configuration.

Given the cost data in Table 1, it is useful for purposes of illustration to point out what is implied for the demand side of the capital budgeting equation. As a rule of thumb, for every $1,000.00 ($1) of per subscriber network access line upgrade costs, fully $14.00 ($.014) per month of additional revenues per household served would be required to allow for full capital recovery of the original investment costs over a ten year discounted payback period at a 12% rate of return. This hypothetical includes the rather heroic assumption that new revenues would begin flowing immediately upon completion of the network construction, which is why the cost and implied capital recovery estimates represent a best case for cash flow analysis.

Table 2 provides a rough cost summary and estimates of the associated construction timelines for deployment of mass market broadband network upgrades for cablecos and telcos along with how much new sales revenues per month each would require from every single household passed by the broadband network - - and hopefully subscribed. The numbers are cause for alarm if one is planning to go it alone.[19]

The column in Table 2 labeled "The Next Generation" provides a range of likely costs to upgrade basic cableco and telco analog networks to provide one-way broadband services in the case of telcos and two-way narrowband telephone services in the case of cablecos. This basically puts cablecos and telcos in a position to compete with the other on a more or less equal footing for integrated service to households. While Table 2 indicates that cablecos have a tremendous cost advantage in the near term when considering the costs of network upgrades for integrated service offerings,

it is important to keep in mind that there is little, if any, positive cash flow opportunity from providing traditional local telephone services, and, in the case of long distance service, the costs of interconnection to the PSTN are also substantial. Thus, as expected, we do not observe cablecos scrambling into this market.

The right side of Table 2 presents the costs and implied capital recovery requirements for second generation cableco and telco network upgrades to provide two-way broadband service capability. Notice that now the higher end of the cost range for cableco network upgrades is near to the lower end of the range for telcos, making the ultimate decision to choose between the "passive" non-switched network architecture preferred by cablecos over the "active" switched architecture preferred by telcos a tougher call for cablecos' long term capital budgeting strategy.

Based on this data it is clear that, except for narrowband ISDN and local cable network two-way interactive services, it is very costly indeed for any of these companies to go it alone in building the types of integrated multimedia networks for the mass market that are contemplated in the popular press and that are the objective of national infrastructure policy.[20] Thus, in a sense, the race is on, at least on paper, and, in a sense, it isn't. Who wants to go first to wire up America with broadband?

Based on the cost data in Table 2, even under the heroic assumptions of quick mass market deployment, the additional per household monthly revenues required to pay for the original investment is staggering considering the base of per household revenues spent on telecom service

today. The average household in the US spends about $45 per month on telephone services, and about $25 per month on cable television services. Advertisers pay another $25 per month per household to support over the air broadcasting, or so-called "free" TV, and there is another $7 per month for broadcast radio.

Thus, in total, not counting what an average household spends on electronic devices, there is about $100 up for grabs in a competitive marketplace and this amount is not growing very much at all, and neither is household disposable incomes. In fact over the last decade, the percentage of household incomes spent on telecom services has been flat at about 2%. The percentage of household income spent on cable TV service has also been flat in recent years now that the huge growth rates have begun to reach a market saturation point. Per household broadcast media revenues has been slowly declining. However, there are other potential revenue streams involving portable media like video and video game rentals, which could add another $40B in potential revenues. Revenues from information and transaction services and other advertising services also exist, but there is no solid data on the market potential for such new services.

The current demand data is indicative of the uphill battle faced by a competitive service provider of two-way residential broadband network services. New revenue growth is always going to be subject to the ability of households to afford to pay for fancy new services and the terminal devices which support them. What's more, current revenue streams are supporting the payback for old and current capital investments and may not be immediately available to fund new construction budgets if alternative

investments are more attractive.[21] The bottom line is that, unless an integrated broadband telecom network operator is allowed to freely pursue all revenue opportunities, including partnering with other service providers to save on new construction costs, it is very difficult to justify mass deployment of the new broadband to the home technology.

Even the telcos' own numbers are ... well, numbing. Telephone company studies indicate discounted payback periods for video dial tone network upgrade alternatives ranging from 6-7 years for mediumband systems, with limited functionality and bandwidth, to 12-15 for more advanced broadband systems. This even assumes some rather aggressive demand assumptions on the order of 40% subscribership to a host of new services within 10 years.[22]

Several years ago when the broadband hype was at its peak, a handful of high tech fiber-to-the-home and fiber-to-the-curb start-up companies sprouted with much fanfare and backing from some companies with very deep pockets. In this regard, it is noteworthy that the one that consistently had the largest contracts for its network systems, both in the EC and in the US, Raynet, is now being abandoned by its parent company, Raychem, after racking up about $500M in losses since 1987.[23]

Policy Implications

The upshot of all this for public policy is obvious. Policymakers must open up markets so that all media companies can compete, or cooperate, if necessary to get the job done for infrastructure modernization. By effectively continuing the status quo of allocating monopoly turf, which

most all of the so-called regulatory reform proposals do, it becomes harder to justify the required investments for public network upgrades. The risk of network operators undertaking some of the infrastructure investment projects listed previously would be more acceptable if they had the regulatory freedom to pursue any and all market opportunities.

There are two bureaucratic factions out there which, despite the engineering cost data, still harp about the potential for consumer abuse and price gouging if we let big media companies get together to do something creative for consumers -- and their reasoning is nonsensical.

First, there is the "First Amendment" faction that, in the name of diversity in media, wants at least two "pipes" into every home to assure that no big bad monopolist controls too much of the information. Of course, common carriage principles, and residual regulations for non-discriminatory interconnection to the public network to enforce them, can handle this problem; but that solution is too easy for this faction that wants to protect its incumbent member firms which, more likely than not, enjoy a local media monopoly like cable TV or the only newspaper in town.

In bureaucratic circles, the First Amendment faction rules the policy roost. To the Federal Communications Commission, National Telecommunications and Information Administration (executive branch), Congress and even the Courts, the risk of monopoly control is too great to let cablecos or telcos join together to provide integrated network services. In principle, this faction has no leg to stand on. First of all, no where in the most basic of economics principles is it clear that two (or more) local

media monopolies is better than one. Significantly, based on capital budgeting analysis to date, the relevant choice for a broadband infrastructure network may be one provider or none, not one or more.

Consumers, who have had their appetites whetted by the hype but are still awaiting delivery of the benefits of the information age, are not happy campers. What are we consumers being "saved" from if we can't even get one Information Superhighway? Why force us to wait for two or even more when the governments of the world can't even seem to find the money to build just one? Why would policymakers want to prevent companies from investing to modernize parts of the infrastructure, like household access lines, that virtually everyone wants to use but no one company can afford to build on its own?

If anything, opening up markets to see if only one firm would emerge would actually demonstrate that only one firm may be socially efficient. In any event, it is certainly premature to judge such an outcome and opt instead for the status quo of many media monopolies and the politics of turf allocation. Even some of the most renowned experts in the industry cannot agree on which market segments, if any, have natural monopoly characteristics. For example, in his various writings in books and journals and in evidence submitted in regulatory proceedings, Peter Huber of the Manhattan Institute firmly believes that it is the intercity toll service market which is most likely to support natural monopoly and that basic local exchange service is most likely competitive. This stands in stark contrast to the views of some others. Professor Alfred Kahn, for example, has written and testified to roughly the opposite view. The point is that if

such students of the industry and its underlying technology cannot agree on which markets are or are not naturally monopolistic or competitive, it is patently absurd to rely on the early judgments of bureaucrats and politicians. In any case, why would we assume that the predictions of bureaucrats, academics, or anybody else, are superior to those of businesspersons in their attempt to meet consumer demand.

The other popular policy faction is the "not in my back yard" faction. This faction says that competition is great as long as it occurs outside of one's traditional monopoly service territory. This faction would have us believe that it shouldn't matter that, with no opportunity to expand one's market area by leveraging a strong financial presence in its traditional home market area, it may be difficult to enter another monopolist's traditional market area. The required investment to build a broadband network infrastructure is difficult enough to justify at home let alone competing out of one's current service area with no customer base and no particular technology edge. Who are we kidding? I'm sure NYNEX is planning to take it lying down when Pacific Telesis invades New York, and similarly when Southwestern Bell decides to invade USWEST's home turf, etc.

Nevertheless, this is exactly what Southwestern Bell, to much fanfare and press hype just announced.[24] But, is this really an "out of region" scenario? No. In fact, it is just the type of "in region" scenario which regulators should not only allow but encourage. By first purchasing the incumbent monopoly cable network, Southwestern is piggybacking telephone service on top of the existing cable network. The only reason the deal looks to be "out of region" is that Southwestern is operating the new system and not

the other way around had the cable operator purchased an incumbent telco local network.

In the truly "out of region" scenario, where a foreign telco does decide to invade another incumbent's market without the benefit of leveraging the presence of an existing cable monopoly, it is obvious that the loser will be the small consumer of traditional services. Competition of this sort is only going to target benefits for big high margin customers with a national market presence. On the other hand, the mass market of small users will be left facing relatively lower quality and higher prices than would logically exist if regulators would allow all users, large and small, to benefit by freeing up incumbents to upgrade their public network infrastructure facilities incrementally, with freedom to pursue any and all revenue opportunities from value added services. Surely this scenario is preferred to the former where everyone is skimming everyone else's cream with relatively little incentive to cultivate and develop the mass market along the way.

If politicians were really worried about stimulating infrastructure development, they would get out of the way and let risks and rewards accrue to those firms willing to accept the challenge in an unprotected market environment. Bureaucrats, continually preoccupied with the prospect that granting too much market flexibility to incumbent network operators might result in windfall profits at the expense of captive customers, need to look at the real world evidence to date.

Pursuant to being granted the appropriate statutory authority to deregulate, many state regulators have implemented relaxed regulation or total regulatory forbearance policies only to observe after the fact that few market abuses occurred.[25] In fact, in several cases where state commissions have granted incumbent telcos market flexibility, there was little noticeable market response in the form of creative new service offerings or radical price discrimination. This has led many industry observers, not the least of which includes state regulators themselves, to wonder what all the fuss was about in the first place.

Thus, whether due to the incumbent firms' inability to take advantage of market freedoms or not, the fact of the matter is that market abuses are more a figment of bureaucrats' imaginations and preconceived notions rather than actual experience. Yet to this day, the specter of market abuse continues to take center stage in arguments against relaxed regulation. Market abuse is a bogey man which can only be dispelled by letting unfettered market entry have its day in court.

What about the failure of market competition to provide for the truly disadvantaged market segments, including high cost rural consumers; often considered for public policy purposes as desirous and socially deserving of affordable access to the information superhighway? On this policy front, there is relatively good news and some consensus emerging. Both Houses of Congress and many state regulators have proposed or endorsed what is becoming the objective of academics that have researched the issue of subsidies for certain subscriber groups. That is to implement a competitively neutral and relatively efficient ad valorem surcharge on all

carriers of telecommunications services, the purpose of which is to fund affordable access for all residential consumers in America.[26]

Summary and Policy Recommendations

Traditional regulatory processes must be modified or eliminated to overcome the substantial financial hurdles which private sector firms face in committing funds to network infrastructure development. The first item on the regulatory reform agenda must be to eliminate all the constraints resulting from earnings regulations placed on incumbent public network operators, both cablecos and telcos. Incentive compatible regulation should replace earnings regulation. This means that only the price levels of essential services provided on a monopoly basis (e.g., residential basic access lines and public network interconnection arrangements) should continue to be regulated. Everything else should be completely deregulated.

Second, regulators should eliminate all operating restrictions which prevent entrants and incumbent firms from entering into competitive or cooperative arrangements as market conditions may dictate. Freedom of entry is essential. As in other industries, general business laws will continue to be available to protect against potential market abuses and anti-competitive behavior in the telecoms market.

Third, incumbent monopoly network operators must be subjected to residual regulations regarding non-discriminatory prices, terms and conditions governing public network interconnection arrangements. These rules must be aggressively enforced. If the rules governing physical aspects of interconnection (e.g., standards and information disclosure rules) are

properly designed and supplanted with an appropriate "price imputation" test imposed on the use of underlying "essential facilities" of incumbent monopoly network operators, this will still allow for the realization of economies of scope from vertical integration.[27] The purpose of a price imputation test is to provide an ex-post indicator of the presence of an anti-competitive price squeeze on those competitive network suppliers which must rely on public network facilities. A regulatory and legal complaint process must also be established to prevent predatory pricing and undue discrimination in prices or terms and conditions of service for essential public network facilities of a monopoly carrier.

Fourth, to preserve affordable universal public access to an advanced information infrastructure, a competitively neutral and sustainable value-added service surcharge should be implemented which applies to the sales revenues of all telecom service providers which interconnect to the PSTN (e.g., long distance services, cellular radio services, data services, information services, other value-added and enhanced services including two-way satellite, broadcast, paging and cableco services).

Fifth, residual regulations governing network hardware and control software (as opposed to applications software) compatibility and basic service quality should be established. This will allow equipment manufacturers and service providers to efficiently engineer to public network standards allowing for low cost production of "plug-in" network peripheral devices and consumer terminals. Regulators should not set standards. Rather, they should specify a process and timetable for industry

standards development, and be empowered and prepared to enforce the rules.

Full and fair competition in the consumer's best interest requires that all residual regulations be symmetrically applied to all competing carriers, incumbent and entrant alike.[28] In the case of firms desiring to enter traditional monopoly public utility portions of the market (e.g., residential basic access and local network interconnection), all residual regulations and service and subsidy obligations, (e.g., universal service and so-called carrier-of-last-resort obligations) should again be symmetrically applied. Of course, in any given geographic market, if and when there is a viable competitive alternative to the traditional public utility service provider, then it is no longer an essential facility provided on a monopoly basis, and should simply be deregulated. In which case there are not necessarily going to be any special service and subsidy obligations to worry about, except perhaps for issues of service "red lining" to avoid serving certain classes of consumers within a geographic market area.

Beyond these regulatory reforms, which alone may effectively remove existing disincentives to private investment in public network infrastructure while preserving universal service subsidies, there are a number of other policies that governments may implement to further stimulate investment. These include tax breaks and investment credits, guaranteed loans, seed funding for R&D, etc. This combined policy mix would provide very powerful investment incentives encouraging a relatively rapid deployment of an advanced information infrastructure.

[1] Actually, a friend and colleague, Professor Eli Noam put it this way in a recent editorial for the Wall Street Journal criticizing regulation, as a take-off from the now infamous phrase employed by the Clinton for President campaign staff to keep focused on the primary issue: "It's the economy - stupid!".

[2] The core network refers to the trunk or shared capacity of public networks which underwent very rapid digitization and capacity expansion over the last decade. This still continues today. The rest of the public network facilities are not all shared and, in fact, are usually dedicated to specific households and business locations. These are referred to as local access network facilities or "loop" plant. It is the latter "on/off" ramps which is far and away the primary cost issue for mass deployment of the so-called Information Superhighway".

[3] For an insightful discussion of the political economy of telecoms regulation, see J. T. Wenders, "The Economic Theory of Regulation and the US Telecommunications Industry," *Telecommunications Policy*, pp. 16-26, March 1988.

[4] The Markey-Fields bill covers some areas addressed in earlier (1993) legislation which never passed, including S 1086 (Danforth-Inouye), and HR 1504 (Boucher-Oxley). For a brief description of pending House bills see two issues of *Telecommunications Reports*, November 22, 1993, p. 19 and 45, and November 29, 1993, pp. 1-5.

[5] On May 12, another companion measure was introduced S 2111 (Breaux-Packwood).

[6] For a brief discussion of the "Hollings" bill S 1822, see *Telecommunications Reports*, February 7, 1994, pp. 1-2. Another bill S 2111 which was just announced is much better in that it is considerably less restrictive regarding market entry, however, Senator Hollings opposes it. See *Telecommunications Reports*, May 16, 1994, pp. 1, 41.

[7] The draft legislation does attempt to allow for freedom of entry of new competitors into traditional local exchange markets, but still unduly handicaps the incumbents.

[8] Throughout the process of re-regulating the cable industry's rates and terms of service, the FCC and Congress didn't ever seem to be "in sink" regarding just exactly what Congress intended. This caused a lot of confusion which required continually revisiting the rules establishing rate levels and the process of enforcement. Even after legislation is passed, Congress can, and often does, put informal pressure on agencies like the FCC if they are not happy with the political outcome of the regulatory process, which, in this case, led to tightening the screws on cable rates beyond that which the FCC apparently initially intended.

[9] Per minute toll charges for AT&T, MCI and Sprint along with the average carrier access charges appear on p. 92 of the evidence of P. W. Huber, "Competition and Open Access in the Telecommunications Markets of California," draft, February 8, 1994, filed with the California PUC.

[10] AT&T 1993 Annual Report p. 25.

[11] Furthermore, a firm's market advantage may be very long lived depending on its ability to perpetually build better mouse traps. This paradigm of economic market disequilibrium provides for a realistic view of dynamic market processes and the long term welfare gains which flow from the process. While the economics of disequilibrium is an anathema to traditional neo-classical view of the benefits of marginal cost prices, the latter is a rather naive and static view of markets. In other words, it is precisely the deviation of price from marginal cost, or at least the pursuit of high margins, that drives the engine of economic investment and long term welfare gains. For applications of these notions to telecom markets see B. L. Egan and J. T. Wenders, "The Cost of State Regulation: Theory and Practice," in Crossing *Lines: American Federalism, State Regulatory Institutions, and the Telecommunications Infrastructure*, P. Teske ed. 1994, forthcoming.

[12] However, a recent report from Communications Canada, "Convergence: Competition and Cooperation," Report of the Co-chairs of the Local Networks Convergence

Committee, 1992, wasn't bad. This is most likely due to the fact that representatives of all of the industry factions did not have to "sign off" approval of the report. Those responsible for the new report planned pursuant to the appointment of the 1994 Blue Ribbon panel by Industry Canada will probably not be so lucky. For information on New York, see "Connecting to the Future: Greater Access, Services, and Competition in Telecommunications," The Report of the New York Telecommunications Exchange, December 1993.

[13] Again however, words are not deeds, and it remains to be seen if the government of California truly favors free market entry in practice. See, "Enhancing California's Competitive Strength: A Strategy for Telecommunications Infrastructure," California Public Utilities Commission, November 1993.

[14] See New Jersey Board of Regulatory Commissioners, Decision and Order in Docket No. T092030358, especially those sections describing New Jersey Bell's infrastructure upgrade initiative "Opportunity New Jersey".

[15] See, Egan and Wenders, op cit, and the references therein. Also see A. E. Kahn and W. B. Shew, "Current Issues in Telecommunications Regulation," *Yale Journal on Regulation*, 4:191, 1987.

[16] The original quote came from Charles L. Schultz as he was describing the US political system and the nature of political decisions made within it, in The Public Use of Private Interest, The Brookings Institution, Washington, D.C., 1977, p. 23. Professor Stalon was making an extension of the point that decisions of US regulators, as part and parcel of the political system, would tend to subject to the same rule. See, C. G. Stalon, "Recent Developments in The Political Economy of Regulation: The Sometimes Conflicting Objectives of Efficiency and Fairness," lecture for the NARUC Advanced Regulatory Studies Program, Williamsburg, VA, February, 21, 1992, p. 21.

[17] Average incremental costs used in Table 1 are also called "capacity costs" and are formally equivalent to the total incremental costs of a given construction program, both fixed and variable -- in engineering economics jargon, the total Engineered, Furnished and Installed (EF&I) cost -- divided by the working capacity of the system or objective engineered fill. Excluded are the costs of spare capacity for growth which may exist at any given time and start-up costs. For more information on the costs and costing methods see B. L. Egan, "The Case For Residential N-ISDN," and "The Case For Residential Broadband Networks," Columbia Institute for Tele-Information Working Paper Series, Columbia University, New York. For further information see D. P. Reed, *Residential Fiber Optic Networks: An Engineering and Economic Analysis*, Artech House, Norwood, MA, 1992 and D. P. Reed, "Putting It All Together: The Cost Structure of Personal Communications Services," FCC Office of Plans and Policy, Working Paper No. 28, Washington, D.C., and the various source references therein.

[18] As we consider the hype regarding the mass deployment of very expensive broadband technologies it is amusing to remember the hype from ten years ago regarding the industry forecasts for widespread deployment of narrowband ISDN technology, which, in case the reader is unaware, is still not deployed anywhere in the world on a mass scale. In fact, in the US, residential ISDN service, while widely tariffed, is virtually nonexistent in the market place. Thus, even when ISDN capability is deployed in the public network, subscribership is very low if any exists at all. For an examination of the reasons for the lack of demand see B. L. Egan's article on N-ISDN, op cit.

[19] This data previously appeared in *The New York Times*, February 21, 1993, p. B1.

[20] One policy and strategic planning conclusion for infrastructure investment is that perhaps the relatively low tech, but very low cost, network solution is N-ISDN. This technology is capable of supporting most digital information and transaction services, including slow scan video telephony, which are contemplated for the residential mass

market demand. Even though N-ISDN is not broadband, it is likely to be much easier for network operators to generate positive cash flows.

[21] Not the least of which might be investing funds in foreign markets where infrastructure investments may have a relatively bigger payoff.

[22] Even when Ameritech put forth its most favorable estimates of prospective cash flows for its various proposed video dial tone projects in a recent public disclosure to the FCC, it is obvious that there is little to be optimistic about. They projected 7-9 year discounted payback periods for rather primitive systems even assuming a 40% demand penetration rate over ten years and including business market revenues. This paper specifically does not address business markets since it is not considered a public policy issue for information infrastructure.

[23] "Raychem Abandons Expensive Gamble On Marketing of Fiber Optics Technology," *The Wall Street Journal*, May 17, 1994, p. A4.

[24] "Southwestern Bell Plans Phone Service For Its Cable Customers in Sibling's Turf," *The Wall Street Journal*, May 23, 1994.

[25] While there have been some documented abuses and questionable business practices by incumbent monopolists, they were not necessarily tied to any legislative approval for regulators to pursue deregulatory policies.

[26] For details about how such a subsidy mechanism would work, see B. L. Egan and S. S. Wildman, "Funding the Public Telecommunications Infrastructure," *Telematics and Informatics*, Vol. 11, No. 3, 1994, forthcoming; and, E.M. Noam, "NetTrans Accounts: Reforming the Financial Support System for Universal Service in Telecommunications," draft, Columbia Institute for Tele-Information, New York, September 1993.

[27] The basic rule for a price imputation test is that an incumbent network operator supplying an underlying essential facility on a monopoly basis must make that facility available to its competitors on the same terms and conditions as it is available to the

incumbent itself to provide like services, and that the incumbent's pricing floor for any competitive service offering be equal to the sum of its marginal cost of providing the service plus any profit or contribution it would have made from the provision of the service by a competitive (interconnecting) provider. For a comprehensive discussion of economically efficient imputation, see the articles by W. J. Baumol and J. G. Sidak, W. B. Meyer, and A.E. Kahn and W. E. Taylor in *The Yale Journal on Regulation* , 11:203, 1994.

[28] The only possible exception would be the mandated interconnection requirements placed on incumbent monopoly carriers' unique essential network facilities, and their mandated residual obligation to serve all consumers on a common carrier basis, including the network access subsidies paid to them for purposes of meeting such residual obligations. However the overarching principle of competitive parity suggests that whenever a competitor's network represents a market alternative to the access lines of the incumbent, (e.g., two-way cable and cellular networks), then they are no longer truly essential, and reciprocity of interconnection rules would be called for, and, to the extent that the competitor network also are subjected to residual regulatory obligations like common carriage and universal service, then it too should be able to receive a proportionate share of any subsidies associated with these obligations. However, as stressed above, whenever there is no longer a unique essential facility involved, deregulation is the best policy option.

The Price to Upgrade

Estimated costs for cable and telephone companies to upgrade their network systems nationwide.

	The Next Generation . . .		. . . And Beyond	
	Cable (Fiber optics & coaxial cables)	Telephone (Fiber optics & coaxial cables)	Cable (Two-way fiber & coaxial cable)	Telephone (Entirely fiber optic network)
Cost to Install *	$50-300	$1,500	$1,000-1,500	$1,500-5,000
Monthly revenue †	$1.4	$10-20	$14-17	$20-35
Time frame	3-10 years	5-10 years	10-20 years	10-30 years
Services	Phone, data, cable TV		Phone, data, cable TV, 2-way video, high resolution TV	
Overall cost	$5-30 billion	$75-150 billion	$100-150 billion	$150-500 billion

* Per subscriber. † Extra monthly revenues per subscriber needed to justify the investment

BASE CASE CURRENT COST
Average Incremental Cost (AIC)

Plain Old Telephone Service (POTS)

AIC of new telephone network access line -	$1,000

Plain Old Cable Service (POCS)

AIC of new cable network access line -	$600

Narrowband ISDN (N-ISDN)

N-ISDN telephone company access line upgrade	$100 - 200
N-ISDN upgrade including digital switch	$300 - 500

Mediumband Technologies

Asymmetrical Digital Subscriber Line (ADSL) upgrade	$400 - 600
High-capacity Digital Subscriber Line (HDSL)	$500 - 1,500

Fiber Optic Network Access Line Upgrades

Fiber-to-the-Home (FTTH)

Telephone Company (FTTH) for POTS only -	$3,000+
Future (1995 - 2000)-	$1,000+
Telephone Company FTTH (advanced two-way broadband) -	$5,000+
Future (1995 - 2000)-	$2,000+
Cable Network FTTH (N-ISDN + limited two-way broadband) -	$1,500+
Future -	$1,000

Fiber-to-the-Curb (FTTC)

Telephone Company Fiber-to-the-Curb (FTTC) for POTS only -	$750
Telephone Company FTTC (POTS + POCS) -	$1,350
Cable Hybrid Fiber/Coaxial Network for POCS only -	$30
Cable Hybrid Fiber/Coaxial Network for POTS + POCS -	$190

Wireless Technologies

Traditional cellular mobile service -	$700-1,000
Personal Communication Network "micro-cellular" -	$300 - 500
Future (1995 - 2000)	??
Fixed Basic Exchange Digital Radio (BETRS) -	$3,000 - 10,000
Multi-channel Distribution Systems (MDS) -	$500
Direct Broadcast Satellite (DBS) Television - (includes CPE)	$300 - 800