This series of articles by George Gilder provides some interesting technological and cultural background that helps prepare readers to better understand and place in proper perspective the events relative to the National Data Super Highway, which are unfolding almost daily in the national press. I contacted the author and Forbes and as the preface below indicates obtained permission to post on the Internet. Please note that the preface must be included when cross posting or uploading this article.

> The following article, MIKE MILKEN & THE TWO TRILLION DOLLAR OPPORTUNIUTY, was first published in Forbes ASAP, April 10, 1995. It is a portion of George Gilder's book, Telecosm, which will be published in 1996 by Simon & Schuster, as a sequel to Microcosm, published in 1989 and Life After Television published by Norton in 1992. Subsequent chapters of Telecosm will be serialized in Forbes ASAP.



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# MIKE MILKEN AND TWO TRILLION DOLLAR OPPORTUNITY

# BY

# GEORGE GILDER

**It's time to deregulate America's telecom infrastructure. And let the creative**

**destroyers go to work.**

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MICHAEL MILKEN IS BACK! Back, so the story goes, from the orgies of '80s greed, back from the best-selling den of thieves, back from his preening at the predators' ball, back from soft time at Pleasanton pen, back from prostate cancer and plagues of litigation, back to tell his own book to William Novak and to buy his redemption with the spoils of his crimes. Yes, so they say, Milken is back, while thousands of plundered companies and communities labor to regain their standard of living and jobs, long lost in the shuffle of his dismal deals and loaded down with his "high yields."

Yes, Milken is back. Back from the gutters of Ponzi finance, the rot of junk and S&L sleaze, angling: to launder his weaseled wealth with educational hype and charity hustles. Back, aiming now at history and posterity rather than at new opportunity, but hitting it big instead with Michael Jackson, Doonesbury laughs and Clifton compassion photo ops. Meanwhile, even the ascendant Republicans in Washington try to steer clear of "eighties excesses" of debt and deficits and supply-side economics.

Or so it looks to media observers of the Milken saga. And yet slowly and arduously, there is emerging from the carrels of the Harvard Business School and other institutions a distinctly different tale.

Under the leadership of Michael Jensen, a small group of Harvard Business School scholars has been scrutinizing all the statistics of corporate behavior during the 1980s. They have laboriously appraised the results of all the leveraged buyouts, junk bond issues, venture capital, and other tools of corporate making and remaking. They have arrived at unexpected conclusions and have developed a new body of theory to explain them. From this perspective, the events of the 1980s--and Milken's role--assume a wholly new meaning.

Jensen puts the Milken episode in the context of another form of wretched excess for which Milken was the remedy: namely, the excesses of

corporate waste and conglomeration by empire-building managers with scarcely any ownership stake in their companies. Amid the sieges of deregulation and tax rate reduction, amid the obvious tumult in the markets for oil, tires, tobacco, real estate, gold and commodities, many industries needed profound restructuring. But their entrenched managements were set to expand their domains through acquisition and investment in new capacity. Meanwhile, a thousandfold rise in the cost-effectiveness of microchips, governed by the centrifugal law of the microcosm, rendered obsolete the dominant architecture of information technology.

Most conspicuously, between 1977 and 1987 the percentage of total computer power commanded by centralized systems dropped from nearly 100% to under 1%. Less obviously, but no less profoundly, the equally centralized structures of television and telephony were also falling before the distributive force of the microcosm. Ordaining that the price performance of microchips rises by the square of the increase in the number of transistors on a single chip, the law of the microcosm exalts single chip systems, led by the PC. Pushed into obsolescence were all monopolies and hierarchies, pyramids and power grids of the old information structure, epitomized by the mainframe computer, the broadcast network and the central telephone switch.

The old establishment of AT&T, the big three TV networks and some 1,400 over-the-air broadcast stations was breaking down into a new formation of cable and wireless schemes. Affecting virtually every company in the economy and threatening most existing management plans and practices, these trends created huge opportunities for wealth creation and disruption.

Beginning with his move to Century City in Los Angeles in July of 1978, Milken aggressively rode the microcosm--inside and outside of Drexel. Inside, he concentrated on what Jensen describes as a key role of information technology: "taking the specific knowledge previously scattered through a firm and making it into general knowledge usable by all." In this case, it was a matter of turning Milken's command of the details of hundreds and then thousands of high-yield issues into the foundation for a company that could make these bonds the prime venture capital in the U.S. economy. From the beginning, crucial to this goal was computer technology.

A specialist in finance, information systems and operational research at Wharton, he had begun his career at Drexel in 1970 with a

computerized move to speed up the delivery of securities to its customers, thus saving the company some $ 500,000 in interest charges and setting a new standard in the industry.

In Los Angeles, he created an advanced system for trading based on what was then a state-of-the-art Prime 550 Model 2. Through the RS-232 9600-baud serial ports of up to 250 Televideo terminals, the Prime computer time-shared a Fortran database containing the trading history of all Drexel customers, some 1,700 high-yield securities and some 8,000 securities in the public market.

With a quick query, a member of Milken's team could determine the customer's history, the amount of his potential profits or losses, his investment philosophy and ability to buy new issues. Thus the team could link the buyers and sellers of securities in a uniquely targeted and opportunistic way and could command the detailed knowledge needed to counteract the strong prejudice and ratings stigma against high-yield securities.

Under William Haloc, a former systems analyst for Prime who joined Drexel, the team also developed real-time analytics to allow instant calculation of pricing for these intricate securities. These functions allowed salespeople to view the name, issue and ratings of a security and to compute complex yields and cash flows involving call features, sinking funds, refund schedules, puts, warrants and prices, all instantly calculable on line. Meanwhile, at rival firms, many dealers still fumbled with the levers on $ 3,000 Monroe calculators.

The entire system was monitored by Drexel Burnham's New York headquarters and linked indirectly to the floors of the exchanges by Quotron, Reuters and 10 other on-line services, each with a separate Rich monitor, switchable from a keyboard. These arrays of small black monitors spread across the desk collectively functioned like a present-day Windows display.

Most of the features of Milken's system are Common today. But in 1980 they were novel. This customized $ 2 million computer scheme, with five times that amount for programming and maintenance, gave the Drexel team a mastery of 5 the high-yield market that sometimes seemed positively sinister to outside observers and competitors. But it was not magic or malfeasance; it was the microcosm of the new technology

joined with the knowledge and investment genius of Michael Milken.

More famously, Milken's grasp of the information age extended well beyond Drexel's IS department. Focusing on emergent information companies responding to the tectonic and regulatory turmoil unleashed by the microchip in TV and telephony, Milken channeled a total of some $ 26 billion into MCI, McCaw, Viacom, TCI, Time Warner, Turner, Cablevision Systems, News Corp. and other cable, telecom, wireless, publishing and entertainment companies. At the time, virtually none of these firms commanded substantial collateral acceptable to a bank, and thus they could have raised these billions nowhere else. Now, these companies are collectively worth some $ 224 billion and comprise the foundations of a national information infrastructure unrivaled in the world.

With an eventual $ 2.5 billion from Drexel, MCI built the first national single-mode fiber-optic network and spurred AT&T and Sprint into action to give the U.S. a global lead in the technology. With another $ 1.2 billion, McCaw launched the first national wireless telephone system. And with $ 8 billion, TCI, Viacom, Time Warner, Cablevision Systems and Turner, followed by many other Drexel high-yield issuers, made U.S. cable television a unique national asset, with unequaled programming and broadband links. Redeemed in the process were troubled companies providing equipment and services. One of them was Corning, which supplied 62, 112 miles of state-of-the-art fiber to MCI's pioneering network at a time when Corning had no other customers for this crucial technology developed over the previous 17 years.

Milken's influence reached well beyond his actual transactions. A once-lame Disney was restructured with Milken's guidance and takeover pressure in some three years of 5 a.m. meetings with Roy Disney, Frank Wells and Stanley Gold. Then worth $ 1.8 billion, Disney emerged as a revamped Hollywood colossus worth $ 30 billion 11 years later in 1995.

Comprising more than half of all high-yield bond issues, Milken's activities also embraced thousands of companies beyond the telecom, cable TV and entertainment field--for example, building Hasbro into the world's leading toy company and Barnes & Noble into the leading independent bookseller. His example helped inspire many rivals, including Kohlberg Kravis Roberts, Forstmann Little, and Morgan Stanley, who also made heroic contributions to this campaign of corporate renewal. In particular, Morgan Stanley channeled crucial billions in high-yield funds to the computer, semiconductor and hard-disk drive industries during extreme industry crises in the mid- and late 1980s as

Drexel was leaving the scene.

Between 1976 and 1993, Jensen calculates that in these campaigns of corporate restructuring, American corporations conducted 42,621 merger and acquisition deals worth a total of $ 3.1 trillion. In these transactions, selling: firms won premiums of some 41%, generating $ 899 billion in constant dollar gains to the shareholders. Since buying firms also gained on average, by increments that increased over the years, Jensen's estimate represents a lower bound on the yields of the restructuring movement.

No substantial evidence supports the speculations by Larry Summers (now Treasury Undersecretary) and others that these gains disguise large wealth transfers from bondholders, workers, suppliers and communities. Indeed, the evidence assembled by Jensen, Steven Kaplan of the University of Chicago, Harvard economist Andre Schleifer and Jensen colleague Karen Wruck, among others, shows that capital expenditures, employment, and research and development all rose in the aftermath of these transactions.

As Jensen now sums it up: "These are lower-bound estimates because they do not include gains that came about later or voluntary gains that were achieved as a result of hostile offers. I don't know any way to add up all these benefits. But it is clear that the impact was dramatic and it left us much more competitive as a country. Today the Japanese and the Europeans are suffering from their delay of restructuring and the U.S. is much leaner and more efficient."

Both Jensen and Milken agree that the opportunities today exceed even the gains of the 1980s. Impelled by the restructuring campaign, the real value of the equity of public firms more than doubled between 1981 and 1990, rising by $ 1.6 trillion, or from $ 1.4 trillion to $ 3 trillion. Since then the pace of technical change has accelerated and the possibilities for a deregulatory breakthrough have soared with the election of a new Congress. Forbes ASAP projects possible stock market gains for the rest of this decade of another $ 2 trillion.

The heightened pace of change, however, creates a desperate need for restructuring. This $ 2 trillion opportunity depends on emancipating into the markets the resources currently trapped in obsolete structures by capital gains taxes near 40%, compounded by

inflation, and by new antitakeover rules and outdated telecom regulations. Flowing again into a new communications infrastructure, into venture funds and into restructuring campaigns, freed capital can endow entrepreneurs with the power to align their companies with the most potent force in the history of technology.

But first, America needs a new Milken.

**The Onrush of the Telecosm**

**With chip densities still doubling every 18 months and chip sales up nearly 30% each of the last two years, with computer MIPS (millions of instructions per second) per dollar doubling every year and computer sales up over 25% in each of the last two years, with hard-disk cost-effectiveness doubling every nine months, and fiber-optics bandwidth exploding a thousandfold while fiber deployment spreads at a pace of 1,300 miles a day--the onrush of technology is now accelerating well beyond the pace of the 1980s.**

In essence, the law of the microcosm is now potentially converging with the law of the telecosm. This law ordains that the value and performance of a network rise apace with the square of the increase in the number and power of computers linked on it. As these forces fuse, the world of computers and communications can ride an exponential rocket.

The 50 million new computers sold into America's homes and offices over the last two years guarantee a huge market for broadband networks. Half of the PCs sold in December bore Pentium microprocessors, and 60% of the PCs went into homes. These computers process data at a pace rapidly approaching 100 MIPS. Early in the next century, just five years from now, most American households will command multimedia teleputers processing data in billions of instructions per second and pouring it out at gigabit-per-second rates--or as much as a million times the current digital dribble of 9.6-kilobit modems.

But not today. This computer-rich, bandwidth-poor situation means a crippling and unnecessary mismatch between microcosm and telecosm, between the power of PCs and the bandwidth of the networks that serve them--between PC instructions per second on single-chip silicon and telco bits per second on twisted-pair copper wires. Tens of millions of PC owners are demanding electronic commerce, distance learning, full-motion videoconferencing, and ready access to the graphics and hypertext of the Internet. World Wide Web.

Yet phone and cable executives dawdle with market surveys and experiments with interactive TV that amazingly manage to prove that people don't even want full-motion movies. Meanwhile, the values and sales of their companies languish. In the last 12 months, for example, the 24 leading telecom and cable companies, led by the Regional Bell Operating Companies, lost an average of 12.8% of their market value. Facing a world of shining broadband opportunities in their own businesses, narrowband executives grope for glamour in Hollywood and grasp for growth overseas.

American industry is still cowed by overreaching regulators obsessed with corporate power. In a world of exploding competition in the telecosm -galvanized by new wireless and wireline technologies emerging every week--the administration, the FCC and Congress have long been paralyzed by nightmares of John Malone of TCI and a possible single-wire stranglehold in St. Louis or of a blight of disinvestment in phone service for South Dakota or Alaska.

If current fears of monopoly result in a contrived two-wire mandate on America's communications infrastructure, however, all the hopes for an integrated broadband two-way net will die until well into the next century. With oceans of bandwidth languishing just out of reach, the tremendous resource of broadband home computers will waste away, gasping on the beach for two-way channels for teleconferencing, telecommuting, telemedicine and telecommerce, while the telephone and cable companies "compete" with rival offerings of mostly one-way floods of movies, shopping and the Sega Channel for TVs. By betraying its precious world-leading endowment of PCs in order to save its existing telcos and TV companies, the U.S. still could make a literal $ 2 trillion mistake.

**The Amazing Vindication of Junk**

**To grasp the size of possible opportunity and the possible mistake, let us return to Milken and his achievement of the 1980s, which set the stage for the current drama. Never in history has a convicted white-collar felon been so luminously vindicated by the passage of time. His six alleged felonies dwindled to a series of debatable violations, devoid of insider trading and essentially costing their victims nothing (or a total of $ 318,082, according to a dubious estimate by the court that forced him into a plea through RICO threats against him, his family and Drexel). Returning to the volumes of the 1980s peak, his supposed Ponzi scheme of junk finance became the most profitable class of domestic fixed-income securities of the early 1990s.**

Indeed, if the few Savings & Loans that held a substantial portfolio of junk had been permitted to keep it, they would have survived, prospered and paid millions of dollars of taxes rather than collapsed into the hands of the FDIC. For example, the shareholders of Columbia Savings & Loan may have suffered from Thomas Spiegel's undue extravagance in company jets and bullet-proof bathrooms. But the government crackdown cost them $ 700 million and cost the taxpayers $ 1 billion, though the bank was on track to profit massively from falling interest rates on its deposits and thriving high-yield securities.

Entrepreneurs such as ex-Drexel luminary Leon Black, who purchased the bonds from the government at bargain-basement rates, became billionaires on the proceeds and were charged with gulling the regulators. Meanwhile, the companies that Milken financed with these securities now form the foundations of a new information economy.

A minor triumph came at the end of 1994 when Vanity Fair magazine, avid vessel of many a lurid exposed of Milken and his team, published a lavishly photographed story on "America's New Establishment." Among the 19 names were Ted Turner, Craig McCaw, Sumner Redstone, Gerald Levin, John Malone, Rupert Murdoch, Barry Diller, Michael Eisner, Ronald Perelman and Bill Gates. Although Milken was never mentioned, all these high fliers--with the exception of Gates--rose to prominence largely or partly on a cresting tide of Milken's junk.

Why does junk work! Primarily because it frees capital from corporate bureaucracy and gets it into the hands of entrepreneurs.

During the 1980s, lower taxes and new technologies had transformed the economic environment. What was precious in the 1970s--metals, minerals, real estate and collectibles, all mashed together in diversified conglomerates and tax shelters-became disposable junk in the 1980s. What was junk in the 1970s and early 1980s--Milken's array of leveraged cable, fiber, wireless and content schemes--became the precious foundations of a new information infrastructure.

How could this be so? How could one man with a poorly named venture-debt financing vehicle contribute so hugely to the U.S. economy while, according to Jensen's analysis, the nation's 500 largest corporations, led by a $ 100 billion opportunity loss at General Motors in 11 years, incurred negative returns with their free cash flow (cash flow beyond the amount needed to fund all internal investments with a positive net present value)?

Did not Franco Modigliani and Merton Miller win a Nobel prize for their so-called M&M theorems showing that the performance of corporations is independent of their capital structure? Have not scores of economists pursuing the Efficient Market Hypothesis demonstrated that in general the capital exchanges are fully efficient, that company prices reflect all of the available information and no individual investor can systematically outwit the tape without illegal manipulation or insider trading?

In his presidential address to the American Finance Association in 1993, however, Jensen answered all these arguments. On the basis of new research on the experience of the 1980s, he declared that the M&M theorems, "while logically sound, are empirically incorrect."

The central problem of the corporation, according to Jensen, is the "agency" dilemma-the divergence between the interests of the managers and the owners of large businesses. This problem is inherent in all cooperative human endeavor: the interests of the individuals always deviate at the margin from the goals of the group. But in times of rapid technological and political transformation, as Jensen argues, the agency gap becomes a gulf. The structure of the corporation, the training of its engineers, the skills of its executives, the costs of its processes all become misaligned with the realities of a new technological base, a rapidly changing state of the art, and a political environment in upheaval.

General Motors was the worst example, investing $ 121.8 billion during the 1980s in R&D and capital equipment while the value of the company dropped to $ 22.9 billion. IBM invested $ 101 billion while its value was dropping to $ 64.6 billion by the end of 1990 (on the way to further collapse to $ 41 billion in early 1995). Collectively, the 500 largest U.S. corporations wasted hundreds of billions of dollars of free cash flow. What was needed, according to Jensen, was a total overhaul of most of these companies, their strategic redirection, and the replacement or redeployment of roughly half of the existing managers. What occurred was a prodigal waste of resources in defense of the obsolete structures and practices of the incumbent management.

Creating most of the new value during the 1980s were companies funded or restructured by corporate raiders, venture capitalists and even--in the case of a $ 75 billion gain from the AT&T breakup--the courts (disbanding a monopoly previously created by government). Using equity, venture capitalists overcome the agency gulf by playing an active controlling role on company boards and managements and by insisting that executives are compensated chiefly through stock and options. Using venture debt and an array of complex securities, Michael Milken overcame the agency gulf by similarly active intervention.

Millken channeled billions of dollars into companies such as McCaw or MCI largely owned by the management, to compete with industry leviathans. For companies not owned by their executives, he funded leveraged buyouts that transformed nonowner managers feeding on free cash flow into heavy owners of equity with virtually no liquid resources. Contracted to divert all their free cash flow to the holders of high-yield debt, the new owner-managers were forced to please the capital markets in order to fund any new projects.

**The Productivity Boom**

**With the agency problem solved, these companies became lean and mean leaders of the global economy. Contrary to the claims of many economists, from Alan Blinder to Lester Thurow, productivity soared. Mired in the murky data on service-sector productivity--which was stultified by the practice of measuring most outputs by the cost of the inputs--economists tended to miss the prodigious real growth of the**

**1980s. For example, in the brokerage and finance arenas, productivity stagnated in the data, but between 1973 and 1987 the number of shares traded daily grew from 5.7 million to 63.8 million, while employment only doubled in the industry.**

Manufacturing productivity numbers, though more accurate, also suffer from severe miscalculations. In a world of creative destruction, they tend to assume that products, such as computers, that decline in price are dropping in value. And while registering every new steel ingot, automobile or chocolate bar, they assume that novel products represent no productivity gain at all. These are not trivial mistakes. During the past 20 years, the cost of computers has dropped approximately one millionfold. Yet the Bureau of Labor Statistics shows merely an annual drop varying between 14.9% in 1992 and 6.7% in 1994. The government has finally recognized the flaws in this statistical series, and is moving ever so slowly to correct it. But the problem is fundamental.

Using the criteria applied to productivity in the auto industry, the statisticians would have to multiply the improvement in computing cost-effectiveness by the increase in the number of computers sold. Thus, with the explosion of sales of billions of microcomputers of all kinds, from desktop systems to embedded devices, a consistent BLS would find that the contribution of computers to gross domestic product was close to a billion times larger than the entire GDP of 1970. Of course, such an exercise would be preposterous. But hardly more preposterous than mostly ignoring the productivity gains in these industries of rapid advance, plummeting prices and cornucopian innovation.

Even using existing data, total factor productivity in the U.S. manufacturing sector more than doubled during the 1980s from the level during the previous 30 years. From 1950 to 1980, this productivity index rose an average of 1.4% per year; between 1981 and 1990, it rose at a rate of 3.3%. Labor productivity rose from 1.4% per year in the earlier period to 3.8% in the `80s. Contrary to the usual claims, wages rose at least 10%, according to Social Security system data, while the number of jobs rose by 18 million.

But the most striking productivity surge came in the growth of the productivity of capital. In essence, Milken, Kohlberg Kravis Roberts, Forstmann Little and others took the vast incarcerated capital resources trapped in old-line businesses and put it back into the markets. Not only was the productivity of the capital left behind hugely enhanced by

the disciplines of restructuring, but the freed capital flowed into venture funds and high-yield markets where it fueled what Jensen calls "a Third Industrial Revolution."

The results were dramatic. In decline for 30 years, at an annual rate of minus 1.03%, the capital productivity index has long been beloved by Marxists as a portent of the collapse of capitalism. During the 1980s, however, this decline was decisively reversed. The productivity of capital as measured in the data rose by 2.03% annually as computerized information systems transformed the technology of finance.

Decisively reversed as well was a long decline of U.S. market share in the global economy. By the period between 1987 and 1992, U.S. corporations were generating 47.7% of all the profits in the industrial world on 37.5% of the revenues. Spearheading the U.S. economy were information firms, with some 70% of global profits.

Thus was overthrown by the restructuring of the 1980s all the indifference theorems, Efficient Market Hypotheses, corporate optimality concepts, macroeconomic monotheories wielded in business schools and economics departments to explain away the power and "wash" away the paramount worth of individual entrepreneurs and investors. Indeed, the giant corporation, with managers largely free of ownership claims, gained its preeminence as a way of diffusing risk among millions of stockholders with diverse portfolios. But with the securitization of venture debt by Michael Milken and others, these behemoths emerge as marketplace survivors largely because of their prowess at politics, litigation and media management--core competencies that in the course of a decade succeeded both in derailing the Milken threat and enacting laws and regulations to forestall any followers.

Perhaps because of a bias in favor of the capitalists, Jensen's course vies with Michael Porter's similarly entrepreneurial class as the most popular in the last 15 years with students at Harvard Business School--a fact which bodes well for the future of the economy.

Jensen and Milken agree that today's economy faces technological transformations, agency misalignments and restructuring chances even greater than the economy of the late 1970s and early 1980s. "The opportunity is truly huge," says Jensen. ASAP estimates that in this

40% larger economy, there should be a chance for Milkenesque investors to raise stock market value by more than 67%, implying both a revitalized U.S. economy, a Dow level over 6500, a Standard & Poor's Index exceeding 700, and a Nasdaq over 1400.

The question remains, however, how to realize these gains. Because of the incredible continuing grip of obsolete regulations and the huge mismatch between microcosm and telecosm, the fabulous new fiber and wireless technologies have yet to force a corresponding industrial restructuring. The same old players are still on the field protected by the same government rules, administered still by Judge Harold Greene in the Modified Final Judgment breaking up AT&T 11 years ago, and regulated still by the FCC, the Federal Trade Commission, the Justice Department and 5O state Public Utilities Commissions as if history had stood still. Forty million computers with multimedia powers remain stranded in homes with four-kilohertz copper connections to the world while communications companies still ponder the perplexities of interactive TV and regulators ruminate about how to prevent monopoly and preserve universal service.

**Cable TV's Impending Death**

**Capsizing this entire teetering apparatus of petty fears and pettifoggery will be this year's ascent of new wireless technologies. The basic problem of universal service is that with current wireline telephony and cable TV, it costs 10 to 30 times as much to serve rural customers as urban customers. By nature, the U.S. Senate is dominated by rural customers. Many are Republicans. Therefore, universal service has posed a paralyzing problem for programs of deregulation. But new wireless digital technologies have utterly banished this problem.**

At a time when all voice telephony is rapidly moving to wireless, new digital cellular systems will soon lower the price of wireless telephony tenfold and totally close the gap in costs between rural and urban customers. At the same time, with supreme universality across the entire continent, Direct Broadcast Satellite already delivers service superior to cable. Already in the sky, DBS is a big bang that will ultimately transform the entire corporate landscape of U.S. communications with a cascade of imperious new realities.

In digital DBS, GM Hughes, Hubbard Broadcasting and Thomson's RCA have delivered a knockout new conduit for delivering one-way video. In image resolution, in audio quality, in number of channels and in raw reach and efficiency of point-to-multipoint transmission, DirecTV not only decisively outpaces even the studio offerings at cable company headends but also vastly and instantly excelled them in coverage.

Currently the only weakness of DBS is a lack of certain critical content such as local and broadcast network programming. The lack will be addressed, with the help of Michael Milken, by major new restructuring this year.

Absolutely devastating to broadcast cable TV, a still more powerful DBS will send reverberations throughout the broadcast industry and profoundly affect computers, government regulators and telephone companies as well. As Milken explains, "Everything in the information economy is connected to everything else."

As government regulators will be the last to notice, DBS utterly overthrows the prime premise of cable regulation: the view that cable commands some kind of monopoly in delivering one-way video programming. Far from a monopoly, one-way cable TV is essentially dead. In response to DBS, cable has no choice but to change its business radically to two-way computer services.

The market opportunity is obvious and immense. The Internet boasted five million host computers and over 30 million estimated users in January, and growth of 26% in the last quarter of 1994. The largest spurt of expansion in recent history, this surge came despite acute frustration at the narrow bandwidth of available phone connections.

At present, only the cable TV industry commands conduits to homes capable of accommodating these multimedia teleputers. One-gigahertz cable TV coax can accommodate some eight billion bits per second of two-way data or some 5,000 channels of the kind of MPEG1 video now offered in one direction by DBS. Such bandwidth could accommodate ubiquitous videoconferencing and commerce. By contrast, your phone line modem labors to transmit 14.4 thousand bits per second, or enough to send one MPEG movie in two weeks.

Reaching 63% of U.S. households, including at least 92% of homes with PCs, cable supplies the obvious conduit for the exploding computer business. Intel, General Instrument, Digital Equipment, Hybrid and Com21, among other companies, are supplying cable modems and software for high-speed bidirectional traffic over the existing cable plant. But consummation of the network will entail large investments in fiber and switching at a time when cable is just emerging from its regulatory shadows into the deadly Ku-band radiance of DBS.

The most obvious source of capital is the RBOCs, the local telephone companies (though Milken stresses that the public utilities are a major alternative). The Bells already command nine times as much fiber as cable TV does and invest every year more money than the total $ 23 billion of cable revenues. What they lack is bandwidth for broadband access to homes.

The key to access to these huge new computer markets, therefore, is forthcoming congressional action to permit collaboration between the RBOCs and the cable companies within their own regions. If necessary, the telephone companies must be allowed to buy cable companies and merge their systems. The coming ascent of DBS should relieve the fears of monopoly that have long deterred action. If it does, the cascade of change spurred by DBS will lead to a flood of new commerce and communication on the networks of America.

The endowment of DBS with new programming clout, however, will prove to be the last triumph of conduit-content convergence. The restructuring paladins of the broadband era will devote much of their efforts to dismantling the content-conduit conglomerates that currently dominate the cable industry and that are now in formation by the telephone companies.

In a broadband era, content-conduit combines no longer make sense. Consider that you are Warner Entertainment, a content company. You do not want to restrict your movies to one conduit. You want to sell them through everyone's conduit. Consider that you are Warner Communications, a cable firm. With eight gigabits per second--enough for 5,000 movie channels--you want to sell everyone's movies, not restrict yourself to Warner's.

Efforts to mix content and conduit--artists and engineers-produce misaligned companies that need restructuring. Content follies crowd into the agency gulf. Nynex, Bell Atlantic and Pacific Telesis gave superagent Michael Ovitz $ 14 million to pursue more "content" while Ameritech, BellSouth and Southwestern Bell (SBC) romanced Disney.

What would a new restructuring king do in the face of such ham-handed diversification? Bring on the raiders. Sic some junkyard Doberman on the succulent bells and whistles acquired by cable and telephone firms. Let him spin off their recent acquisitions and interactive TV experiments and game channels and refocus these companies on the computer networking business where they belong, and where they can harvest the bonanza of a global economy rapidly uploading onto the Net.

**The Two-Wire Delusion**

**Washington has to make a choice. Is it going to allow a freedom model that permits telephone companies and cable companies to combine as common carriers to build a true broadband infrastructure, in which millions of entrepreneurs can cavort and compete in content and context? Or will regulators impose a spurious competitive model, with two or more wires to every home, all imitating the current cable strategy of wannabe content-conduit monopolies.**

As venture capitalist Roger McNamee warned in the Feb. 27 issue of ASAP: "There is an unspoken assumption in government circles that we can move local loop communications to a fiercely competitive business model and build an information superhighway at the same time...an implicit assumption that the regional Bell operating companies and the cable companies are a bunch of knuckle-dragging dimwits who will build the superhighway no matter what... [But] telecom businesses are characterized by high fixed costs. There is no such thing as limited competition... As you infuse competition...the value model of the industry collapses. And when it does, the effect will be exactly the same as stepping on a large cow pie in your hiking boots."

Congressman Jack Fields, new Republican chairman of the House Telecom Subcommittee, disagrees: "I am convinced that the [industry] people we talked with will respond to telecom reform. They have tens of billions of dollars parked on the side of the information superhighway waiting for us to pass a piece of legislation to give definition and certainty to the scene." But the people he consulted--chiefly the leaders and the lobbyists of the RBOCs and cable companies--are not the ones who will decide whether the highway is built.

Making that decision will be the same capital markets that punished Bell Atlantic and TCI for their broadband plans and thwarted the merger between them. As soon as it became clear--through the passage of the cable re-regulation act of 1992 and related policies of the FCC--that the regulators would permit collaboration only in regions where the two companies had no competitive advantage, the case for the combine collapsed. Under a regulatory system in which the government can sweep down and confiscate profits and channel them into quixotic schemes of universal service in three dimensions for the homeless or require irrational competitive behavior in a two-wire multisubsidiary world, a true broadband two-way network makes no business sense. What will emerge instead is an array of dueling brands of 500-channel TV, claiming to be interactive for the benefit of Congress and the press.

Capital markets will avoid cow-pie competition at all costs. Under these circumstances, a true broadband system will not be completed until 2020 in the U.S. But the competitive model is fundamentally misconceived.

To the Washington regulators and their elected allies, competition has always meant rivalry between the existing competitors--long distance, broadcast, Baby Bells and Cable TV--and the regulation succeeds as long as all the teams stay on the field. But all technological competition--all innovation--consists of the pursuit of fugitive positions of monopoly. Current legislative proposals from the administration and its congressional allies resemble a broad national effort in 1981 to defend the mainframe BUNCH (Burroughs, Univac, NCR, Control Data, and Honeywell) from imperial IBM. Just as the IBM "monopoly" was about to fall before the microcosm, led by Intel and Microsoft, so the RBOC and broadcasting "monopolies" are about to fall before the telecosm of broadband digital computer networks, which will also sorely challenge Intel and Microsoft.

The new information infrastructure will bring a cornucopia of new services from a variety of new sources that cannot even be defined as yet. All we know is that none of the existing rivals is likely to survive in recognizable form. Only a true freedom model that allows a complete reconstruction of the world of communications--with anyone collaborating or competing, merging or metamorphing with anyone rise--can allow this new era to come to fruition. Only a freedom model can release the $ 2 trillion of new asset value that the scholars of restructuring promise for the U.S. economy of the 1990s and beyond.

This result the Republicans on Capitol Hill command the unique and precious and passing opportunity to achieve. So open the floodgates of capital for new corporate raiders and remakers, venturers and reinventors. Rejoice in the return of Milken and pray that he be joined by scores of rivals, including those allowed to use the securities markets. Virtually all the cable and telephone companies, from MCI to TCI to SBC, should be up for grabs, by each other and from outside firms. Sitting on $ 10 billion of cash, IBM could fruitfully enter the fray, or be frayed itself. IBM could combine its global ATM network with cable access to homes. For many of these companies, capital is far less scarce than vision.

Milken cites MCI. "Twelve years ago, they had a cash shortage with billions of dollars of capital expenditures to make. They had a clear understanding of what their business was. We supplied them with billions of dollars of capital and that fueled the spread of fiber optics throughout the country during the 1980s. Today their situation is far less clear. They have $ 3 billion in cash, they could borrow $ 6 billion more; they've got a strategic worldwide partnership with British Telecom. Today the challenge is not capital. It is vision. It is, what should MCI's future be?"

With MCI's current resources, it could buy cable facilities across the country, join them with its fiber network, complement them with wireless personal communications services and Internet connections, and outwit AT&T as brilliantly as it did in the 1980s. But it has to be willing to bet the company again. The question is whether the current management, with Bill McGowan in his grave, can escape the agency trap, shun the cushions of large corporate life, and become a real competitor again rather than a protected player in a continued government sham of "competition."

When a visitor at one of the Capitol Hill offices in charge of telecom policy points to the benefits of real competition and restructuring, the politician will usually respond: "The companies do not tell us that." The dirty little secret of all too many telephone and cable companies is that they prefer government-regulated "competition" to real entrepreneurial risks and rewards. As long as telco and cable lobbyists fail to urge true competition, these companies deserve much of the blame.  for the Third World regulations that still limit the horizons of their industry.

Amazingly, however, the situation is changing from an unexpected source. While much of industry still lags, the politicians seem ready at last to seize the day with a new freedom model.  Now the congealed glaciers of telecom can begin to break up under the blows of a reinvigorated market for corporate control.

Perhaps, the best solution will be again to deregulate Milken.

**Postscript: The Return of Mike Milken**

**One morning, in his office on a quiet street in Los Angeles near Bel Air, Milken is probing some of the outward edges of the new regime, delving into a business plan for ridefilms.  Ridefilms are a brand new industry of convergence that blends features of theatrical films, theme-park rides and arcade games.  Giving the viewer the sensation of plummeting motion and soaring flight on platforms that move in sync with motion on the screen, these systems are virtual reality that really works.**

Presenting the project of the day is Whitmore Kelley of Berkshire Motion Pictures, the firm that created the pioneering "Back to the Future: The Ride" for Universal Theme Parks.  He is proposing Ridetime, a low-cost system of theater capsules for children between the ages of four and 10.

These turnkey theaters could bring ridefilms to malls, shopping centers, toy stores, theme parks, resorts, restaurants and family entertainment centers at a toll of $ 1.50 per child, eight children at a time. Offering four-minute musical adventures with engaging plots and educational themes, these systems would be the first to shun the "testosterone market" of the arcades and focus on young children.

Milken had heard enough. He confessed he had only been able to read five sections of the business plan during the two or three minutes that had elapsed. But with a quizzical Columbo look, he said he had some questions. He had recently seen similar systems in Norway and Sweden. Small groups of parents and kids together paid the equivalent of $ 4 apiece to plummet down an Olympic Alpine downhill or bobsledding course. No, they weren't real ridefilms, with synchronized physical movement, but they were cheap to produce and offered a similar experience and there would be a lot more where those came from. How would Berkshire compete with these? Let's say he owned space in an arcade. Teenagers pump in money all day long and deep into the night. Why would he give space to a children's ride that takes up twice as much room and closes down at bedtime? Interactivity? Watch out for that. Kids today get real interactivity on their computers and Nintendo machines at home. Any effort to provide interactive features for eight kids at once might well turn them off. Where would the parents be? They would see the show for nothing, standing behind the kids, without the motion that makes it interesting. That's a downer. A four-year-old will demand that the parents sit with him. The parents are your customers. Make them pay and let them ride.

Commenting that Kelley had described other ridefilm companies as the competition, Milken demurred. The computer software industry would be the competition. He grilled Kelley on the size of the capsule, its cost per square foot, its yield to the owner of the space in a mall, the quality of the images, the nature of the liquid crystal projection technology.

As Kelley described it, "Milken is so mentally aggressive and determined I was astonished. I came in and he began playing the flute and several other instruments at once, and I had to figure out what the dance was and start moving and shaking in time. Teaching, learning and testing at the same time. . .he was amazing." At the end of the presentation, Milken announced that he was impressed and would go visit a prototype of the new system nearby in the L.A. suburbs.

Or watch him on President's Day in a paneled room in Atlanta's Occidental Grand Hotel. He is contemplating a new learning network as a climax to some 25 years and $ 250 million of Milken family ventures in the field of education. Milken has assembled leading experts on education, film and finance to consult with the CEO of the new project, Hamilton Jordan, recently of Whittle Communications.

Milken began with the crucial rule that the educational network "go first to the home, later to the schools," rather than the other way around (which was Whittle's mistake). "The teachers themselves will bring any good material into the schools," he said. He ended by suggesting that the group had radically underestimated the size of their potential market. He pointed to his earlier investment in Interface Group, the sponsor of Comdex, recently sold to Japanese entrepreneur Masayoshi Son of Softbank Corporation for $ 800 million. Virtual conferences and teleconferences for training and education and lifelong learning could become a leading vehicle of convergence, joining software, computers, consumer electronics, telephones and even public utilities.

As he summed up, he declared that the size of the educational market, appropriately defined today to include corporate training, was not $ 400 billion as Jordan had said, but more than $ 1 trillion. Visionary and trenchant as ever, lifting the horizons of all around him, Milken was clearly back.

**Breakup Candidates?**

**AT&T: In both history and promise, AT&T may be the world's greatest technology company, combining microcosm with telecosm more intimately than any other. With Bell Labs, 59% of the long-distance market, and McCaw's access to the local loop, AT&T today also should be one of the most valuable companies in the world. But its management has reduced its market cap to just over one times sales, making it nearly the cheapest major phone company in the country. Bell Labs performed much of the early work on the vital new multimedia communications technology of asynchronous transfer mode (ATM), but a new startup named Fore Systems dominates the market with scores of other companies. Judge Green broke up AT&T once. Smart management would break it up again.**

TIME WARNER: Time Warner went to the well for high-yield securities in 1984 at the time of the Atari crash. It plunged deep into debt to save the company and preserve it film assets. With Lorimar, it produced more than a third of all TV programming; with Warner films, it was the dominant Hollywood force; with Warner records, it ruled music; and with Warner Communications, it was the second-biggest cable system. In other words, it followed the content-conduit strategy. Unfortunately, this strategy twisted its Orlando project into unprofitable knots. Mobilizing some of the best technology in the world-Silicon Graphics 3D interface and servers, AT&T ATM, Scientific Atlanta's 64QAM transmission-Warner compressed it into a TV set-top box and centralized server system focused on delivering movies over cable conduits. This business won't pay for the plant. Perhaps belatedly recognizing this problem, the company is now veering in the oppsite direction, ordering 1.5 million new analog set-top boxes for $ 250 million from General Instrument. Don't they grasp the deadly meaning of the DBS big bang?

This company needs restructuring to get ready for a broadband world. It must spin off its precious content and transform its conduit to accommodate the only real interactive machines with market penetration, namely PCS.

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