I. THE ENDURING MYTH OF THE LOCAL BOTTLENECK

The AT&T/MCI Report argues that the local exchange is a "natural monopoly." Natural monopoly is "fundamentally a static concept."[1] This monopoly, the Report maintains, can readily be extended into adjacent markets.[2] A few small segments -- those serving large customers in urban areas perhaps -- may become competitive. Others will not.[3] Thus, any BOC can exercise "bottleneck" power over -- say -- the long-distance and information-service markets.[4] If permitted to enter those markets, it can capture them. Market power in any one part of a market means market power throughout the "overall production process."[5]

National Markets

Though it never quite says so, the AT&T/MCI Report quietly assumes that the nation is served by a single, monolithic local telco, which controls the one and only link between a long-distance carrier and all its customers. This assumption is essential to the "bottleneck" imagery. The single, National Bell Operating Company -- the "NBOC" -- is the neck; everyone else is throttled in one big bottle.

But there is no NBOC -- there is no single bottle. There are, instead, eight large economy-size bottles, and lots of smaller ones too, pouring telephone traffic into national networks.

That most major telecommunications markets are national, not local, has been emphasized often by the FCC, the Department of Justice,[6] and even AT&T itself. "[A]ll interstate, domestic, interexchange telecommunications services comprise a single relevant product market with no relevant submarkets," the FCC has stated.[7]

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[1] ECONOMICS AND TECHNOLOGY, INC./HATFIELD ASSOCIATES,INC., THE ENDURING LOCAL BOTTLENECK: MONOPOLY POWER AND THE LOCAL EXCHANGE CARRIERS 21 (1994) (hereinafter AT&T/MCI Report).

[2] AT&T/MCI REPORT at 33.

[3] *Id.* at 85.

[4] *Id.* at 22, 27-29, 198. ***See also, generally,*** *Id.* at § 6.3.

[5] *Id.* at 33.

[6] "As the FCC, AT&T, MCI, various BOCs, and other commenters pointed out, the market for most interexchange services is national; it cannot easily or logically be subdivided along regional lines corresponding to the territories in which various BOCs provide (or do not provide) local exchange service." Response of the United States to Comments On Its Report and Recommendations Concerning The Line-of-Business Restrictions Imposed On The Bell Operating Companies By The Modification of
Final Judgment at § III(C)(2)(a), No. 82-0192 (D.D.C. April 27, 1987).

[7] Fourth Report & Order, In the Matter of Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, 95 F.C.C. 2d 554, 564 (1983).

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TABLES

GTE. -- The experience of GTE -- an independent phone company -- in adjacent markets likewise disproves the Report's theory. GTE is a local telco with total revenues considerably in excess of those of any Regional Bell. But GTE, unlike the RBOCs, is not barred from long-distance or information service markets, nor is it forbidden to manufacture equipment. If the Report's concerns were valid, GTE should have been able to leverage its market power in its local exchanges into long-distance and other adjacent markets. Quite the opposite happened. GTE has systematically left competitive markets that are closed to the BOCs.

If the theory advanced in the AT&T/MCI Report were correct, the post-divestiture BOCs should easily have maintained their monopoly in the provision of inside wiring, pay phones, and all customer premises equipment -- since BOCs have been allowed in all of those adjacent markets since divestiture. If the theory were correct, BOC-supplied Centrex should by now have eliminated competition from PBXs. If the theory were correct, BOC affiliated cellular companies should have crushed independents like McCaw. If the theory were correct, BOCs should have captured all corridor traffic in the New York/Northern New Jersey and Philadelphia/Camden corridors, where BOCs have been permitted since divestiture to compete head to head with AT&T and MCI in providing interLATA traffic. If the theory were correct, GTE -- which operates extensive local exchange networks, but is not quarantined by line-of-business restrictions -- should be a dominant player in the long distance business.

But none of this has happened. Call it club theory, call it bottleneck, call it natural monopoly, call it essential facilities -- whatever it is called, the theory does not conform to any facts in the post-divestiture telecommunications industry.

A Network of Networks

The AT&T/MCI Report boldly rejects the view that the telecommunications industry is evolving into a "network of networks," a highly interconnected matrix of wireless, satellite, copper, coaxial and glass, with many providers and no single dominant center. The one-and-only network, the Report maintains, is growing more hierarchical and centralized all the time.

Almost no other observer agrees with this. Indeed, the vision of the *geodesic* network, or something much like it, is now almost universally accepted. The Clinton Administration's commitment to promote development of the National Information Infrastructure is based on "a seamless web of communications networks, computers, databases, and consumer electronics." The FCC describes the evolution of the network in much the same terms. We are moving toward "a robust 'network of networks,' in which the switched networks of CAPs and others interconnect with, but also compete with, each others' as well as the LECs' switched access networks." George Calhoun, the author of two major books on radio telephony, asserts that "the abandonment of hierarchical structures is gathering momentum, especially in the core public network and in specialized computer networks."

In this network of networks, no one provider or group of providers will be dominant, and every provider should be free to compete on equal terms and conditions.

The AT&T/MCI Report further asserts that capacity constraints make wireless "an unlikely replacement for the existing LEC telephone service." The Report is mistaken. The FCC projects "60 million PCS users in the U.S. within ten years." Telocator projects that there will be more than 50 million PCS users by the end of the decade, and more than 60 million users of paging, cellular and specialized mobile radio. Arthur D. Little predicts that PCS could penetrate 40 percent of the residential market by the end of the decade.

Yet another knowledgeable observer recently cited projections of 80-90 million wireless subscribers by the year 2004. He committed his company to "build an integrated wireless strategy [] that will be able to reach virtually every American who wants wireless service" in that time frame. The observer in question was MCI chairman and CEO Bert Roberts.

Consumer Demand

The AT&T/MCI Report purports to have found little consumer interest in switching to wireless or cable alternatives. But, as noted above, both AT&T and MCI are betting many billions of dollars on the expectation that demand for competing local exchange services will be robust and will develop rapidly. These market pronouncements speak far more loudly than any grand theory of local telco hegemony. Lawyers and advocates at AT&T and MCI may believe the theory; corporate strategists plainly do not. The people who are paid to maintain the status quo are quite sure that competition against the BOCs is not possible. The people who are paid to make a profit are quite sure that it is.

Within days after the release of the AT&T/MCI Report, MCI CEO Bert Roberts declared: "Wireless communication is becoming an integral part of our daily lives, and demand is growing rapidly * * * Customers have been asking us to provide a totally portable communications service that meets their needs any time, anywhere."

If Mr. Roberts distrusts the survey data presented in the AT&T/MCI Report, he has good reason. The survey is rife with ambiguity and error. The consumer survey on which the Report relies makes the mistake that such surveys often make: it erroneously assumes that consumers can make intelligent choices between technologies they haven't yet seen. If no other lesson has been learned from the wireless experience of the last decade, that one should have been. When the Bell divestiture was announced in 1982, AT&T was projecting that 1.5 million customers might subscribe to cellular service by 1990. In fact, there are 14 million subscribers today.

Demand for landline-based alternatives is likely to evolve equally fast. As discussed earlier, consumers in the one market (Britain) in which regulators have already unleashed cable telephony have responded eagerly.

Nor is there any need to speculate dolefully about demand for CAP services, either; the AT&T/MCI Report is wisely silent on that subject, at least. The locales served by CAPs contain the headquarters of nearly 60 percent of the companies that appear on the *Communications Week* list of top telecommunications users. Between 60 and 75 percent of largest business customers already rely on CAPs for at least part of their access services. There is every indication that demand will continue to grow rapidly.

BOC Entry Into Adjacent Markets

The policy questions that the AT&T/MCI Report attempts to influence do not turn, in the end, on what degree of market power may still exist in the local exchange. There is now a decade of experience of actual BOC participation in adjacent markets against which the Report's theories can be tested directly. There is no evidence that BOCs have leveraged whatever LEC market power they might have in any of these adjacent markets. In all of these markets, prices have dropped, output has increased and competition is flourishing.

Corridor Traffic. -- In the New York/Northern New Jersey and Philadelphia/Camden corridors, BOCs *already* compete directly against AT&T and MCI in the interexchange market. The BOCs here converted their lines to equal access much more quickly than the national average, and the switched access rate charged by the BOCs offering corridor service was no higher than the rates charged by other BOCs in comparable markets. BOCs have not captured any large share of these markets.

Videotex Gateway Information Services. -- BOCs have gained nothing even remotely close to a dominant share; two of the four BOCs that entered the market have since abandoned it. Subscribership has increased dramatically.

CPE. -- The BOCs distribute their own private exchange system (Centrex) which competes directly with non-BOC PBX systems. But in a decade of head-to-head competition, sales of Centrex systems have not advanced at the expense of PBX systems.

Wireless. -- The two largest cellular providers (McCaw -- soon to be purchased by AT&T -- and GTE Mobile Communications) are not BOCs, and between 1988 and 1992 the BOCs' share of cellular subscribers decreased. The market for wireless communications is poised to expand dramatically with the advent of "personal communications services" (PCS); BOCs will possess only a small fraction of PCS licenses.

Public Pay Phones. -- The number of installed pay phones has increased steadily since 1984. Non-BOC independent providers have accounted for over 60 percent of new installations.

100 purchasers of telecommunications products and services.[57] Recent surveys confirm that a large proportion -- between 62 and 77 percent -- of larger business customers rely on CAPs for at least part of their access services.[58] For example, six major CAPs currently offer services in direct competition with Pacific Bell in California. Their operations are centered in the large urban areas, particularly Los Angeles and San Francisco. But CAP networks are expanding rapidly beyond these major commercial centers to reach many smaller business communities.

As discussed above, CAPs can capture a significant portion of local revenues, at a fraction of the cost needed to provide a ubiquitous network, by carefully targeting only the very highest users. For example, BellSouth has reported that MFS competes for 25 percent of the total business revenues in Georgia with a fiber network of only 47 route miles. By comparison, BellSouth's network in Georgia consists of more than 100,000 route miles. Other economies also give CAPs an advantage. As Bear Stearns points out, the FCC's recent Interconnection Order "will allow CAPs to add new customers before constructing new distribution rings out to their premises."[59] In other words, CAPs will be able to build up an entire customer base in a new territory with little upfront investment. CAPs will also benefit from the fact that they face less regulation than the local telcos.

No one can seriously doubt the financial viability of CAPs. Major cable companies like Jones Intercable, Adelphia Cable, Continental Cablevision, American Cablevision, Century Cable, Rochester Cable and Time Warner have become major investors in CAP networks. Numerous cable-CAP deals have been announced in the

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[57]CONNECTICUT RESEARCH REPORT, 1991 ALTERNATE LOCAL TRANSPORT ... A TOTAL INDUSTRY REPORT 11, 60-146 (Feb. 1991); J. GROSS, DONALDSON, LUFKIN & JENRETTE, INDUSTRY REPORT NO. 1226863, LOCAL TELEPHONE COMPETITION (May 18, 1992); Anita Marks, *Electric Lightwave Readies Expansion Worth $120 Million*, BUS. J. PORTLAND, Mar. 1, 1993, § 1, at 1; Penni Crabtree, *Bell Tolls for PacBell Monopoly as Teleport Moves In*, SAN DIEGO BUS. J., Feb. 8, 1993, § 1, at 1; W.N. DEATHERAGE ET AL., S.G. WARBURG & CO., COMPANY REPORT NO. 1157417, PACIFIC TELESIS GROUP (Dec. 23, 1991); *Top 100 Users and Strategic Mission Awards*, COMMUNICATIONSWEEK, May 18, 1992, at 44-45.

[58]Pacific Telesis ex parte, Nos. 91-141 and 91-213 (F.C.C. Apr. 29, 1992); J. KRAEMER, DELOITTE & TOUCHE, COMPETITIVE ASSESSMENT OF THE MARKET FOR ALTERNATIVE LOCAL TRANSPORT (1991) (Deloitte & Touche estimates that, in the absence of significant competitive response by the telco, a CAP "can be expected to achieve a 40 to 50 percent share of the DS-1 and DS-3 markets in [its] geographical service area."). According to a survey by the Yankee Group, only about half of all virtual private network customers opt for access through their local telco rather than using direct dedicated links to the interexchange carrier. Ellis Booher, *Virtual Network Equals Savings*, COMPUTERWORLD, Mar. 5, 1990, at 51. *See also* Bob Wallace, *Firm Installs SDN, Waits on Tariff 12*, NETWORK WORLD, Sept. 4, 1989, at 1; *John Hancock Completes Cutover from WATS to SDN; Change Expected to Save Firm $1.2M Annually*, NETWORK WORLD, Aug. 27, 1990, at 2. J. Dix, *Communications Options; The World Beyond AT&T*, COMPUTERWORLD, Dec. 30, 1985/Jan. 6, 1986, at 33.

[59]K.M. LEON ET AL., BEAR STEARNS & CO., INC., INDUSTRY REPORT NO. 1316457, TELECOMMUNICATIONS SERVICES (Feb. 1993).

Despite these obstacles, however, U.S. cable-telco alliances are now preparing to invade each others' regions. The AT&T/MCI Report attempts to make much of the fact that cable telephony will "require significant capital investments." But it strains credulity to suggest that these new alliances lack the economic muscle or staying power to compete against incumbent telcos.

In any event, the cost estimates in the AT&T/MCI Report are not in line with those accepted by independent analysts. The Report assumes, for example, that 100 percent of cable plant will need to be upgraded. But cable will obviously compete for the most lucrative customers, who can be served at the lowest cost. Nor does the Report properly account for the fact that in upgrading cable plant, cable/telco alliances will be investing to serve two markets, not one. Broadband cable networks will carry video and data, as well as telephone service. Growth in the first two sectors will cover much -- perhaps all -- of the cost of the upgrades.

Wireless. -- The AT&T/MCI Report devotes many pages to proving that wireless cannot compete with landline -- not today, and probably never.

This pessimistic conclusion has apparently not been shared with upper management or corporate strategists at either AT&T or MCI. AT&T recently announced it would pay some $17.5 billion for McCaw, the nation's largest cellular carrier. AT&T's "ultimate goal," it stated in a recent FCC application, is the provision of "affordable, nationwide," radio-based telephones, with "[f]eatures and quality comparable with the wireline network." Interestingly, the AT&T/MCI Report contains no mention of this new foray by AT&T into local exchange service.

MCI's wireless plans, now bankrolled by the "Regional Bell Company" of the United Kingdom (British Telecom), are almost as ambitious. MCI/British Telecom have combined revenues of $30.4 billion, far in excess of those of any RBOC. In late 1992, MCI organized a consortium of more than 250 cable, CAP, and independent local phone companies to develop a national PCS network. MCI reportedly intends to spend $10 billion over the next decade to build a PCS system that will cover 90 percent of the population.

More ambitious still is MCI's latest wireless announcement -- which filled the business pages exactly 14 days after the AT&T/MCI Report was released. MCI/British Telecom announced plans to pay $1.3 billion for 17 percent of Nextel, which is rapidly developing a nationwide digital wireless system. The service is expected to be integrated with Network MCI, the company's multimedia communications venture. MCI plans to offer the digital wireless service in the nation's top 10 markets within a year. Against this background, it borders on the surreal to read that wireless is too expensive and simply cannot compete with existing landline services. These developments, too, are not mentioned anywhere in the AT&T/MCI Report.

MCI itself purchased a CAP, Western Union Advanced Transmission Systems (ATS).[68] Western Union ATS has a presence in over 100 cities -- mostly rights of way and conduit, but also some lit fiber which it leases to other carriers.[69] MCI recently unveiled a plan to develop "MCI Metro," an alternative local transport network[70] aimed first at large business customers in major metropolitan areas,[71] and later at residential customers.[72] "MCI Metro" intends to launch operations in over 20 cities.[73] MCI has committed $20 billion toward the creation and delivery of new services for customers and $2 billion toward a local switching and fiber infrastructure.[74] According to MCI's chairman and CEO, Bert Roberts, MCI intends to "attack the RBOCs' local markets through our MCI Metro company."[75] Apparently, Mr. Roberts has not yet been informed that CAPs are not economical or that RBOCs are an impregnable natural monopoly.

Cable

The AT&T/MCI Report confidently states that, "[n]o cable system offers local telephone service today".[76] This is not true. U.S. cable companies, often working in collaboration with U.S. local telcos,[77] are already offering a great deal of cable

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[68] *Western Union Sells Advanced Transmission Systems Business to MCI*, PR NEWSWIRE, Mar. 8, 1990.

[69] *Ibid.*

[70] Martin Dickson, *MCI Puts Dollars 2bn into Local Challenge*, FINANCIAL TIMES, Jan. 5, 1994, at 15; *MCI Unveils Long-Range Vision: Network MCI; Opens Nation's First Transcontinental Information Superhighway; Announces $20 Billion in Strategic Initiatives*, BUSINESS WIRE, Jan. 4, 1994.

[71] Diane Duston, *MCI's Move into Local Market Fits Washington's Deregulatory Mood*, ASSOCIATED PRESS, Jan. 5, 1994.

[72] Martin Dickson, *MCI Puts Dollars 2bn into Local Challenge*, FINANCIAL TIMES, Jan. 5, 1994, at 15.

[73] Candee Wilde, *MCI Is Betting on Local-Loop Investment*, COMMUNICATIONSWEEK, Jan. 24, 1994, at 3A; *Gore reforms promise to sweep away restrictions*, FINTECH TELECOM MARKETS, Jan. 20, 1994.

[74] Martin Dickson, *MCI Puts Dollars 2bn into Local Challenge*, FINANCIAL TIMES, Jan. 5, 1994, at 15; *MCI Unveils Long-Range Vision: Network MCI; Opens Nation's First Transcontinental Information Superhighway; Announces $20 Billion in Strategic Initiatives*, BUSINESS WIRE, Jan. 4, 1994.

[75] *Cable Deal is Possibility; MCI Goes for 'Now' Wireless Technology for Nationwide Network*, COMMUNICATIONS DAILY, Mar. 1, 1994, at 1.

[76] AT&T/MCI REPORT at ii.

[77] The most prominent of these are Nynex, U S West (in cooperation with TCI), and Southwestern Bell (in cooperation with Cox Cable). These three RBOCs hold the franchises for the largest numbers of households: Nynex cable has access to 2.7 million homes; US West/TCI cable has access to 2.1 million homes; and Southwestern Bell/Cox cable has access to 1.2 million homes. CABLE TELEVISION

last few years in cities across the country.[60] Cable interests now control over 50 percent of CAP revenues.[61] Comcast, which provides cable TV service to nearly 3 million subscribers, also provides phone service[62] and has acquired a majority interest in Eastern Telelogic, a CAP serving the greater Philadelphia area.[63] One of the largest CAPs, Teleport, is owned by 5 cable companies: Cox, Comcast, TCI, Continental and Time Warner.[64] Teleport itself is courting cable companies as joint venture partners in new markets.[65] TCI is also the sole owner of Digital Direct. Digital Direct, in turn, is acquiring Penn Access, which operates a CAP network in Pittsburgh.[66] The cable-CAP alliances are carefully positioning themselves as alternative competitors in the local exchange market.

It is ironic to learn from the AT&T/MCI Report that CAPs have no future. As investment analysts have recognized, "the growth of access carriers is being encouraged, if not orchestrated, by the long-distance companies."[67] In March 1990,

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[60]For example: Kansas City FiberNet, which provides CAP services on both sides of the Missouri River, was formed three years ago when ATC, TCI, and TeleCable agreed to combine their territories to create an all-fiber cable network. F. Dawson, *Opportunity Knocks*, CABLEVISION, Sept. 23, 1991, at 37. Continental Cablevision and Hyperion Telecommunications have likewise formed a joint venture to operate a CAP in Jacksonville, Florida. F. Dawson, *The PCS Puzzle*, CABLEVISION, June 1, 1992, at 32-33; *Continental Cablevision in Joint Venture To Offer Local Access Services on Fiber System*, TELECOMMUNICATIONS REPORTS, May 18, 1992, at 37. Teleport Denver is expanding its 115-mile fiber optic network in collaboration with the local cable franchisee. *Teleport Denver Expanding Fiber Network Under Arrangement with Local Cable Franchisee*, TELECOMMUNICATIONS REPORTS, Aug. 17, 1992, at 10.

[61]THE YANKEE GROUP, CAP MARKET UPDATE: YEAR OF TRANSITION 6 (Feb. 1992).

[62]In 1992, Comcast paid $1.1 billion to acquire Metromedia's cellular interests, including the Metrophone system in the Philadelphia area. *Comcast to Acquire All of Metromedia's Philadelphia Cellular Interests*, TELECOMMUNICATIONS REPORT, Mar. 9, 1992, at 21.

[63]*Comcast Acquiring 51 Percent Interest in Competitive Access Provider Eastern Telelogic*, TELECOMMUNICATIONS REPORT, July 20, 1992, at 12.

[64]John Enders, *Expanding Cable's Possibilities; Companies Announce Ventures, Inventions*, SAN FRANCISCO CHRONICLE, Dec. 2, 1993, at F1.

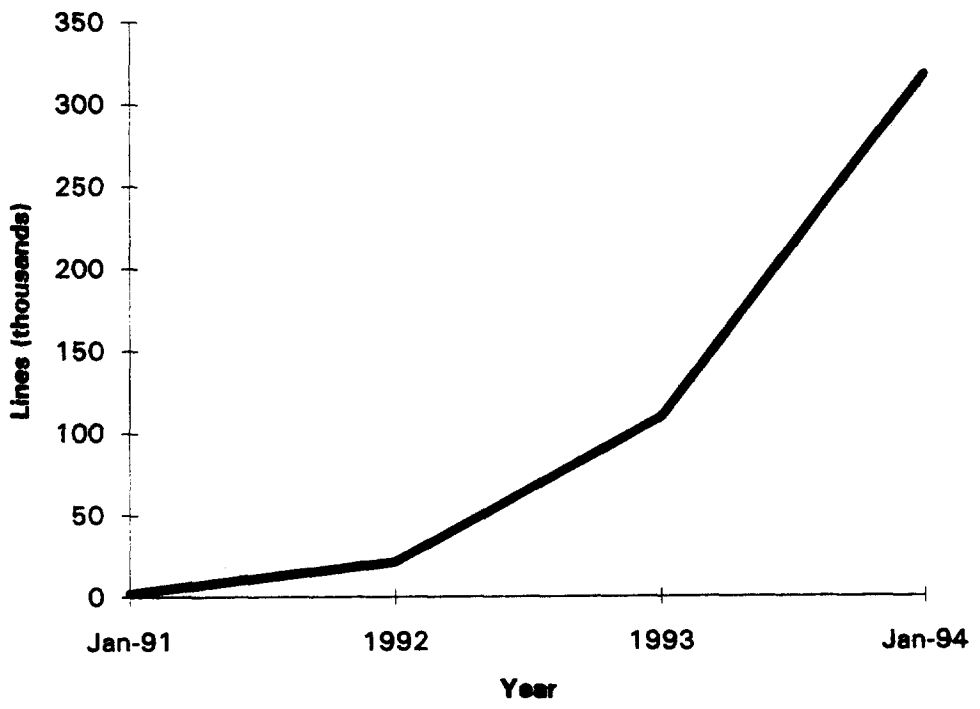
[65]*Alternative Access Business Examined at NCTA*, COMMUNICATIONS DAILY, May 6, 1992, at 5.

[66]COMMUNICATIONS DAILY, Feb. 7, 1992, at 3.

[67]Sanford Bingham, *A 2d Divestiture Looms in U.S.; Small Access Carriers Challenging Local Bell Monopolies*, INT'L HERALD TRIBUNE, Oct. 7, 1991 (quoting DLJ vice president). AT&T's vice president for network services has openly declared his company's commitment to obtaining access from a variety of local suppliers. *Alternative Access Business Examined at NCTA*, COMMUNICATIONS DAILY, May 6, 1992, at 5-6.

comparable growth of cable telephone service, it would soon have some 45 percent of the U.S. local exchange telephone market.[84] At a recent NCTA convention, cable

Figure 2. Telephone Lines Served by United Kingdom Cable TV Companies



industry representatives declared their intention "to take on the telephone industry."[85] According to former NCTA President James Mooney, "[t]he biggest telecommunications story of the decade may turn out to be not telcos' creating broadband networks, but cable technology and architecture proving to be the most efficient means of delivering the next generation of communications services."[86]

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[84]70 percent of 56.5 million cable subscribers, as a percentage of 89.8 million households with telephones (93.9 percent of 95.6 million total U.S. households). U.S. INDUSTRIAL OUTLOOK 1994, at 29-2. Telephone Conversation with U.S. Census Bureau Representative (Feb. 15, 1994).

[85]*Politics Also Mentioned*, COMMUNICATIONS DAILY, May 5, 1992, at 4.

[86]*Ibid.*

telephone service in the United Kingdom. In 1991, the British government opened all levels of the telecommunications market to competition.[78] Ten cable operators immediately obtained licenses to offer telephone service. By the middle of 1993, U.K. cable companies were serving 230,000 households with telephony.[79] U.K. telcos are now losing an estimated 15,000 subscribers a month[80] to cable telephony.[81] FIGURE 2. Cable companies already provide telephone service to 15 percent of the homes they pass and to 70 percent of the homes that subscribe to cable.[82] Industry analysts project that U.K. cable companies will capture 20 percent of the telephone market within ten years.[83] Apparently the numerous cable-telephone investors in Britain have not been informed that cable telephony does not exist and cannot come into being because of the incumbent telco's impenetrable natural monopoly.

The potential market for cable telephony in the United States is even greater than that in the U.K. In the U.S., cable passes far more homes, and many more of those homes subscribe to cable. If cable companies in the United States experienced

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ASSOCIATION (May 20, 1993). Nynex currently offers cable telephony in Bromley, Brighton, and Portsmouth; U S West/TCI currently offers cable telephony in Edinburgh, Merton/Sutton, Croydon, Kingston/Richmond, and Avon; Southwestern Bell/Cox currently offers cable telephony in North Liverpool, Wigan, and Black Country. INDEPENDENT TELEVISION COMMISSION/THE CABLE TELEVISION ASSOCIATION.

[78] *This Week*, THE ECONOMIST, Mar. 9, 1991, at 49.

[79] John Manley, *British Telecom Prepares to Fend Off Threat from Cable TV Operators*, AFX NEWS, Oct. 27, 1993.

[80] Kevin Maney, *Experimenting in the U.K.: Phone, Cable Deals Let U.S. Test Future*, USA TODAY, June 28, 1993, at 1B.

[81] At the same time, the telephone portion of the combination drove penetration growth for the video side. In the first year that cable companies offered telephone service, they saw their cable subscribership increase by more than 53 percent. Since January, 1991, the number of subscribers to cable television has more than tripled to nearly 475,000. DIXON, GOODWIN & CO., TECHNOLOGY ASSESSMENT - UK CATV/TELEPHONY 2-3 (Aug. 1993). In contrast, in the United States, 98 percent of households are passed by cable television and 60 percent actually subscribe. NCTA, CABLE TELEVISION DEVELOPMENTS 1-A.

[82] Of the 350,252 lines installed by cable TV companies offering telephone service by October, 1993, 242,633 were provided with telephone connections. ICT News, Oct. 1993, CABLE TELEVISION ASSOCIATION.

[83] *Wired Planet,* THE ECONOMIST, Feb. 12, 1994, at Survey 13.

of Jones Intercable[93] with an option to gain a controlling interest within the next eight years.[94] At the same time, Southwestern Bell announced a joint venture with Cox Cable.[95] British Telecom, through its 20 percent ownership of MCI,[96] is also heavily involved in the local exchange. MCI has recently announced a joint experiment with Jones Intercable to test phone service over the Jones cable network in Alexandria, Virginia.[97] **MAP 4.**

The AT&T/MCI Report nonetheless exaggerates the fact that cable telephony will "require significant capital investments."[98] Based on its business case scenarios, the Report estimates these costs at $660 to $1,130 per subscriber.[99] Astonishingly, the Report makes no serious attempt to compare those costs with the alternative landline copper-loop costs, which one authority estimates range from $1,200 to $2,000 per access line.[100]

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[93]Christopher Chipello, *Corporate Focus: BCE Faces Promises and Perils of Telecommunications; With Jones Deal, Company Bets on Interlocking Cable, Phones, Multimedia*, WALL ST. J., Dec. 6, 1993, at B4; Edmund Andrews, *Company News; BCE to Buy 30 % of Jones Intercable*, N.Y. TIMES, Dec. 4, 1993, at 39.

[94]Christopher Chipello, *Corporate Focus: BCE Faces Promises and Perils of Telecommunications; With Jones Deal, Company Bets on Interlocking Cable, Phones, Multimedia*, WALL ST. J., Dec. 6, 1993, at B4; Edmund Andrews, *Company News; BCE to Buy 30 % of Jones Intercable*, N.Y. TIMES, Dec. 4, 1993, at 1.

[95]Anita Sharpe, *Cox, Southwestern Bell Agree to Form a $4.9 Billion Cable-TV Partnership*, WALL ST. J., Dec. 8, 1993, at A3.

[96]Martin Wolk, *MCI Seen Likely to Look for Acquisitions*, REUTER ASIA-PACIFIC BUS. REV., June 3, 1993.

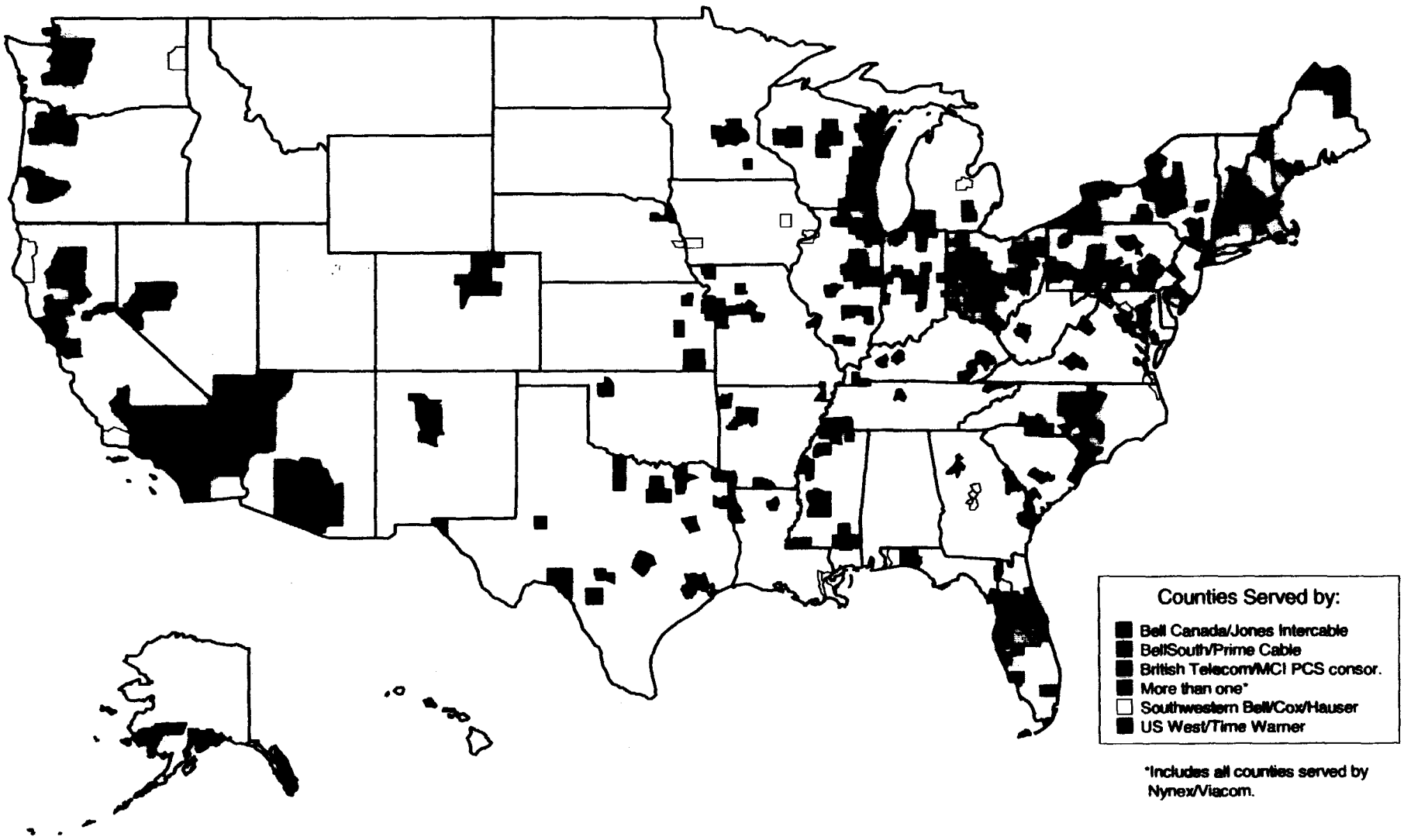
[97]*MCI, Jones Phone Home*, VARIETY, Dec. 6, 1993, at 20.

[98]AT&T/MCI REPORT at ii.

[99]*Id.* at 101.

[100]These costs are distance-sensitive and can range anywhere from $300-$400 on the low end, to $3,000-$5,000 in rural areas. GEORGE CALHOUN, WIRELESS ACCESS AND THE LOCAL TELEPHONE NETWORK 547 (1992).

Map 4 Out-of-Region Telco-Cable Alliances



It strains credulity to suggest that these new alliances lack the economic muscle or staying power to compete against incumbent telcos. Time Warner is the country's second largest cable provider, Viacom is the 13th largest and Prime Cable is the 24th largest cable provider.[101] BCE is the largest publicly owned company in Canada,[102] with 1992 revenues of almost $21 billion.[103] BCE has 9.4 million access lines;[104] it owns all of Bell Canada,[105] all of BCE Telecom International, 66 percent of BCE Mobile Communications and 52 percent of Northern Telecom, the world's fourth largest telecommunications equipment manufacturer.[106] Jones Intercable and its affiliates currently operate 106 cable systems in 24 states, with 1.5 million subscribers.[107] British Telecom is currently the fourth largest telecommunications company in the world,[108] with 1992 revenues of $26.7

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[101]NCTA, CABLE TELEVISION DEVELOPMENTS 14-A. Time Warner operates 13 of the 50 largest cable systems in the United States -- systems that serve cities in NYNEX, BellSouth, Southwestern Bell, Pacific Telesis, Ameritech and GTE territory. *Id.* at 15-A. Time Warner also operates 30 cable systems that are dispersed throughout Bell Atlantic's region. Viacom owns cable systems serving San Francisco (in Pacific Telesis' telephone territory), Puget Sound, Washington (in U S West's), and Nashville, Tennessee (BellSouth's). One of Prime Cable's systems operates in Chicago, where the local telephone exchange is Ameritech's, and another is located outside Houston, in Southwestern Bell's territory. WARREN PUBL., TELEVISION & CABLE FACTBOOK 1994, at D-1979.

[102]Christopher Chipello, *Corporate Focus: BCE Faces Promises and Perils of Telecommunications; With Jones Deal, Company Bets on Interlocking Cable, Phones, Multimedia*, WALL ST. J., Dec. 6, 1993.

[103]*Ibid.*

[104]J.C. SMITH, PRUDENTIAL SECURITIES, COMPANY REPORT NO. 1381885, BCE INC. (Oct. 29, 1993).

[105]*Business Brief -- Bell Canada: Regulators Reject Request on Local Telephone Rates*, WALL ST. J., Aug. 31, 1993.

[106]Christopher Chipello, *Corporate Focus: BCE Faces Promises and Perils of Telecommunications; With Jones Deal, Company Bets on Interlocking Cable, Phones, Multimedia*, WALL ST. J., Dec. 6, 1993; Alan Gray, *Hitting Pay Dirt with R & D; Bell-Northern Research Has Niche in Global Market for Its Leading Edge Communications Products*, THE GAZETTE (MONTREAL), Aug. 5, 1991, at TWIB3.

[107]TELEVISION AND CABLE FACTBOOK 1994, at D1958-D1959; NCTA, CABLE TELEVISION DEVELOPMENTS 14-A, 2-A.

[108]Mary E. Thyfault, *Overseas Connection -- Hot on AT&T's Heels, MCI and BT Team Up to Offer One-Stop Shopping for Global Networks*, INFORMATIONWEEK, June 7, 1993, at 12.

billion[109] and 25.5 million access lines,[110] nearly 8 million more than the largest Bell Company.[111]

Other aspects of the cost analyses in the AT&T/MCI Report are so tendentious or speculative that they scarcely merit any reply. The Report assumes, for example, that 100 percent of cable plant will need to be upgraded. But cable will obviously compete for the most lucrative customers and those who can often be served at the lowest cost. Upgrading the first 20 percent of cable plant will be far cheaper than upgrading the last.[112] And it need not be upgraded over every inch of its length. As one of the authors of the AT&T/MCI Report has noted elsewhere, "[t]here is no need to replace the coaxial cable that runs into your house. That has plenty of bandwidth today."[113]

The AT&T/MCI Report also fails to account properly for the fact that in upgrading cable plant, cable-telco alliances will be investing to serve two markets, not one. Broadband cable networks will carry video and data, as well as telephone service. Growth in the first two sectors will cover much -- perhaps all -- of the cost of the upgrades. As FCC analyst Robert Pepper has discussed, a fiber network can supply a gigabit of capacity to the home.[114] A television signal requires 45 Mbps. A telephone signal requires about 1/1000th as much. If broadband video transport is priced at a flat rate of $20 per month -- comparable to basic cable television rates today -- then flat rate local telephone service would be priced at two cents per month, if prices were pro-rated according to the fraction of the bandwidth that would be required.[115]

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[109]BRITISH TELECOMMUNICATIONS, 1992 ANNUAL REPORT 2 (1992) (98% of that revenue comes from domestic U.K. operations). The figure quoted in the report is using a September 2, 1993, exchange rate of US$2.00/BP1.00.

[110]*Id.* at 3 (19.7 million residential, 5.8 million business).

[111]BT supplies local, long-distance and international telephone service, customer premises equipment (CPE), mobile communications, yellow pages, and value-added data services. *Id.* at 3-5.

[112]Aleksander Futro, director of technology assessment with CableLabs, a research arm of the cable TV industry, estimates that upgrading about 15 percent of the cable TV network with fiber optic cable will accomplish 95 percent of cable TV objectives. *Cable TV Firms Will Deploy Less Fiber Than Telcos, Industry Official Says*, FIBER OPTICS NEWS, Apr. 8, 1991.

[113]Testimony of Dale N. Hatfield at 3671, In the Matter of Alternative Regulatory Framework for Local Exchange Carriers, No. I 87-11-033, (Cal. PUC, Jan. 26, 1989).

[114]*See* Robert Pepper, Through the Looking Glass: Integrated Broadband Networks, Regulatory Policies, and Institutional Change, 4 F.C.C. Rcd 1306 (Nov. 1988).

[115]*See id.* at 3131.

This calculation is obviously intended for illustration only, but the point is very important. Cable telephone is a lot cheaper than one might suppose, precisely because the physical plant has two uses, not one. Virtually every other observer and analyst in the country,[116] from the Vice President on down,[117] has recognized that voice and video are converging, and that the convergence will redefine the economics of both markets. So too have AT&T and MCI in other contexts.[118] But nowhere in its 253 pages of dense analysis does the AT&T/MCI Report give any serious attention to these extremely powerful economies of joint usage.

The bottom line, in any event, is practice, not theory. Cable operators' use of fiber optics has increased 600 percent since 1988.[119] It is projected to rise 25 percent annually throughout the 1990s.[120] TCI claims that it is now the largest single buyer of fiber-optic cable in the world.[121] The president of the cable industry's trade association estimates that cable companies are now installing fiber at almost the same pace as the RBOCs, and are "gaining fast."[122] Cable companies, now allied with out-of-region telcos, plan to spend $14 billion deploying fiber over the next decade.[123] According to a trade association that has consistently *opposed* the BOCs, 77 percent of national cable installations were capable of two-way communications by the end of 1992.[124] "[T]he cable industry

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[116]As Paine Webber has noted, "unlike previous cycles, the implementation of new technology and applications will be essentially self-funding, as the combination of operating efficiencies via fiber optic cable and incremental cash flow will allow additional investment to be quickly amortized." C. DIXON, PAINE WEBBER INC., INDUSTRY REPORT NO. 1227569, SNEAK PREVIEWS (May 19, 1992).

[117]*Gore Lays Out Roadmap For Data Highway*, INVESTOR'S BUSINESS DAILY, Jan. 12, 1994, at 1.

[118]AT&T has proclaimed its goal of becoming the world leader in the area of networked computing, where the technologies of computers and telecommunications converge. AT&T, 1992 ANNUAL REPORT 5 (1993); AT&T, 1991 ANNUAL REPORT 5 (1992). It has also proclaimed that driven by the global economy, long-distance carriers are "rac[ing] to circle the earth * * * to meet the burgeoning demand for international voice, data and image services." AT&T, 1992 ANNUAL REPORT 6. "The global network is evolving into an information superhighway for the 21st century. With lightwave transmission, high-speed digital switching, dispersed intelligence and international standards, it will provide simultaneous access to voices, data, video and text." AT&T, 1992 ANNUAL REPORT 6.

[119]U.S. INDUSTRIAL OUTLOOK 1992, at 30-13 (1993) (citing the NCTA).

[120]*Ibid.*

[121]Charles F. Mason, *AT&T Takes Center Stage at National Cable TV Convention*, TELEPHONY, May 11, 1992, at 6.

[122]Cable companies are installing fiber 74 percent as fast as the RBOCs. Charles F. Mason, *AT&T Takes Center Stage at National Cable TV Convention*, TELEPHONY, May 11, 1992, at 6.

[123]NATA, 1993-1994 TELECOMMUNICATIONS MARKET REVIEW AND FORECAST 134 (1993).

[124]*Ibid.*

* * * already has in place most of the plant and infrastructure to compete head-on with local telcos."[125]

Wireless

The AT&T/MCI Report devotes many pages to explaining why wireless cannot compete with landline -- not today, and probably not tomorrow.[126] This pessimistic conclusion has apparently not been shared with upper management or corporate strategists at either AT&T or MCI. AT&T recently announced it would pay some $18 billion for McCaw,[127] the nation's largest cellular carrier.[128] In a recent PCS application with the FCC, AT&T declared: "[T]he land, towers, and buildings used to support the microwave portion of [AT&T's long-distance] network" are now "available to support other services."[129] AT&T's "ultimate goal" is the provision of "affordable, nationwide," radio-based telephones, with "[f]eatures and quality comparable with the wireline network."[130]

To that end, AT&T recently formed a new operating unit called AT&T Personal Communications Systems. In 1991, AT&T was granted an experimental license to conduct a PCS trial in Los Angeles.[131] The company also applied for exclusive ("pioneer preference") licenses to serve the country's 70 largest urban areas.[132] According to its 1991 annual report, AT&T "intend[s] to become the market leader in wireless and personal communications services."[133] As investment analysts have noted, existing facilities will give AT&T and other microwave license holders a

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[125]*Ibid.*

[126]AT&T/MCI REPORT at ii.

[127]On top of the $12.6 billion purchase price, AT&T is also taking on McCaw's $4.9 billion of debt. *Gambling on Thin Air*, THE ECONOMIST, Aug. 21, 1993, at 49.

[128]As a Paine Webber analyst observed about the McCaw deal, "AT&T's trying to control wireless from soup to nuts." J. Keller, *AT&T to Unveil Wireless-Data Alliances*, WALL ST. J., Nov. 16, 1992, at B5.

[129]Request For A Pioneer's Preference at 6-7, *In re* Request of AT&T for a Pioneer's Preference Concerning Personal Communications Service, No. 90-314 (F.C.C. May 4, 1992).

[130]*Id.* at 8, 11.

[131]*Id.* at 1.

[132]*Id.* at ii. The FCC has tentatively denied AT&T's request for an exclusive pioneer's preference, which means that AT&T will probably have to get in the same line for PCS spectrum alongside other applicants. *Pioneer's Preferences Panned,* COMMUNICATIONS DAILY, Oct. 9, 1992, at 1.

[133]AT&T, 1991 ANNUAL REPORT 5.

"relatively low entry point, into the mobile communications business."[134] For its part, AT&T's fiancee, McCaw, is already developing a PCS system in Orlando, Florida[135] and has been licensed to conduct additional PCS trials in 9 other areas.[136]

MCI's wireless plans, now bankrolled by the "Regional Bell Company" of the United Kingdom (British Telecom), are almost as ambitious. In late 1992, MCI organized a consortium of more than 250 cable companies, CAPs, and independent local phone companies to develop a national PCS network.[137] MCI reportedly intends to spend $10 billion over the next decade to build a PCS system that will cover 90 percent of the population.[138]

More ambitious still is MCI's latest wireless announcement, which filled the business pages exactly 14 days after the AT&T/MCI Report was released.[139] MCI/British Telecom announced plans to pay $1.3 billion for 17 percent of Nextel, which is rapidly developing a nationwide digital wireless system.[140] The service is expected to be integrated with NetworkMCI, the company's multimedia communications venture.[141] MCI plans to offer this digital wireless service in the

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[134]FIRST BOSTON, THE FUTURE OF THE CELLULAR TELEPHONE INDUSTRY, PART I: INDUSTRY OVERVIEW 44 (Dec. 27, 1991). AT&T now uses less than 10 percent of the capacity available on its 3,000 tower microwave network. *AT&T Seeks FCC License to Test 6 GHZ Personal Communications*, ADVANCED WIRELESS COMMUNICATIONS, July 10, 1991.

[135]O. Corr, *Wireless: Phone May Ring in Pocket Soon,* SEATTLE TIMES, May 23, 1991, at E1.

[136]OFFICE OF ENGINEERING AND TECHNOLOGY, FCC, PCS EXPERIMENTAL APPLICATIONS BY FILED DATE (Aug. 11, 1993).

[137]*MCI Lines Up New Wireless Service Alliance*, ATLANTA CONSTITUTION, Nov. 18, 1993, at E2; *MCI Going Ahead with PCN Plans*, NEWSBYTES NEWS NETWORK, Oct. 6, 1993; Mary Lu Carnevale, *MCI Files Plan For Wireless Phone Network*, WALL ST. J., Nov. 10, 1992, at B1. The current status of the consortium is not clear, in light of MCI's recent investment in Nextel.

[138]Gautam Naik, *The Next Generation: Beyond Ardis, Beyond RAM, Beyond Cellular, There Are PCS and Satellite Networks*, WALL ST. J., Feb. 11, 1994, at R22.

[139]*MCI Will Invest $1.3 Billion in Nextel to Offer Nationally Branded Wireless Services*, PR NEWSWIRE, Feb. 28, 1994; *Study Finds Serious Obstacles to Competition in Local Telephone Market*, PR NEWSWIRE, Feb. 15, 1994.

[140]Comcast, a cable company with 2.7 million subscribers, already owns 17 percent of Nextel. NCTA, CABLE TELEVISION DEVELOPMENTS 14-A. *Cable Deal is Possibility: MCI Goes For "Now" Wireless Technology For Nationwide Network*, COMMUNICATIONS DAILY, Mar. 1, 1994 at 1. James Anderson, *MCI-Nextel-2 Special Mobile Radio Gains Strong Backer*, DOW JONES NEWS SERVICE, Feb. 28, 1994.

[141]*Cable Deal is Possibility: MCI Goes For "Now" Wireless Technology For Nationwide Network*, COMMUNICATIONS DAILY, Mar. 1, 1994, at 1.

nation's top 10 markets, [142] which could potentially serve 95 percent of the U.S. population within a year.[143]

Against this background, it again strains credulity to argue that wireless is too expensive, and simply cannot compete. MCI/British Telecom have combined revenues of $30.4 billion,[144] far in excess of those of any RBOC. AT&T/McCaw generate annual revenues of $66.6 billion, or revenues roughly equal to those of the top five RBOCs *combined*.[145]

Wireless Capacity. -- The AT&T/MCI Report asserts -- though it never shows why -- that "capacity constraints"[146] make wireless "an unlikely replacement for the existing LEC telephone service."[147] The Report is mistaken. To begin with, cellular architecture is inherently expandable, like an accordion. The capacity of all cellular systems, including PCS, can be increased almost indefinitely by deploying additional cells and thereby reusing already-allocated spectrum.[148] More spectrum is being made available, too. In September 1993, the FCC allocated 160 MHz of new spectrum for PCS services.[149] Congress has recently directed the Secretary of

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[142]James Anderson, *MCI-Nextel-2 Special Mobile Radio Gains Strong Backer*, DOW JONES NEWS SERVICE, Feb. 28, 1994.

[143]*MCI-Nexel-3: Services To Be Marketed Jointly Under MCI Name*, DOW JONES NEWS SERVICE, Feb. 28, 1994. MCI CEO Bert Roberts has stated: "This alliance means that Nextel is the platform on which we will build an integrated wireless strategy, and that will be able to reach virtually every American who wants wireless service." Roberts cited a projection of 80-90 million wireless subscribers by the year 2004. *MCI Will Invest $1.3 Billion in Nextel to Offer Nationally Branded Wireless Services*, PR NEWSWIRE, Feb. 24, 1994.

[144]MCI, 1992 ANNUAL REPORT 2 (Mar. 1993); BRITISH TELECOMMUNICATIONS, 1993 ANNUAL REPORT 2 (1993).

[145]AT&T, 1992 ANNUAL REPORT, at inside cover; MCCAW CELLULAR COMMUNICATIONS INC., 1992 FORM 10-K REPORT, F-2 (1993); BELL ATLANTIC, 1992 ANNUAL REPORT 2 (1993); BELLSOUTH, 1992 ANNUAL REPORT 5 (1993); AMERITECH, 1992 ANNUAL REPORT 1 (1993); NYNEX, 1992 ANNUAL REPORT 5 (1993); PACIFIC TELESIS, 1992 ANNUAL REPORT 1 (1993).

[146]AT&T/MCI REPORT at ii.

[147]*Id.* at 91.

[148]In 1984, for example, NYNEX began providing city-wide cellular service in New York City with 18 cells. In 1992 the company operated 340 cells in the city, including microcells one-half to two miles in diameter, and expects to operate more than 700 cells by 1994. COMMUNICATIONS DAILY, July 23, 1992, at 8.

[149]Of this 160 MHz allocation, 120 MHz has been assigned to licensed PCS services, 40 MHz to unlicensed PCS devices. Further, 1850-1880 and 1930-1960 MHz (Channel Blocks A-B) have been designated as MTAs, and 1880-1890, 1960-1970, 2130-2150, and 2180-2200 (Blocks C-G) as BTAs. *New Personal Communications Services Established*, F.C.C. NEWS, Sept. 23, 1993.

Commerce to reallocate another 200 MHz of additional spectrum, previously reserved for government use, to new wireless services.[150] The combined spectrum to be allocated to PCS and related services -- no less than 420 MHz -- is the equivalent of another 16 cellular carriers in every geographical area. Within the next few years, radio-based services will possess spectrum licenses sufficient to offer as much local carrying capacity as is currently being used by *all* landline customers.

New technology will increase wireless capacities further still. Throughout the 1990s, digital compression technology will expand the capacity of all wireless telephony from 5 to 20 times present levels.[151]

What then do independent analysts have to say about the capacities of wireless systems? The FCC projects "60 million PCS users in the U.S. within ten years."[152] Telocator projects that there will be more than 50 million PCS users by the end of the decade, and more than 60 million users of paging, cellular and specialized mobile radio.[153] Arthur D. Little predicts that PCS could penetrate 40 percent of the residential market by the end of the decade.[154]

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[150]The Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, § 6001(a), 107 Stat. 312 (1993).

[151]The Report itself acknowledges that "[t]he Telecommunications Industry Association, the U.S. standards body responsible for developing cellular and other telecommunications standards, has approved two digital cellular standards, IS-54 and IS-95, that will be used by carriers to increase system capacities . . . In general terms, one may assume these techniques may potentially increase a cellular system's capacity by a factor of ten to twenty if the entire location is converted to digital operation." AT&T/MCI REPORT at 91-92. TDMA (Time Division Multiple Access) and CDMA (Code Division Multiple Access) technology will enable providers of cellular service to offer what the customer wants; quality and the ability to call anyone, anytime. CTIA, STATE OF THE CELLULAR INDUSTRY 101 (1992).

[152]Notice of Proposed Rulemaking and Tentative Decision at 26, Amendment of the Commission's Rules to Establish New Personal Communications Services, No. 90-314, (Aug. 14, 1992). The FCC is anxious for this to occur. "Each FCC Commissioner, to a person, has stated his or her intention to allocate PCS spectrum for new entrants, and to do it soon. If at all possible we will complete our work in the next twelve months on providing new opportunities in PCS." Alfred C. Sikes, Remarks before the Cellular Telecommunications Industry Association (Feb. 11, 1992).

[153]*Telocator Study Says PCS Licensing By 1994 Could Bring 23,300,000 Customers By 1997,* TELECOMMUNICATIONS REPORTS, June 1, 1992, at 19.

[154]Fred Dawson, *The PCS Puzzle*, CABLEVISION, June 1, 1992, at 33. Another industry analyst predicts continuing allocation of spectrum for personal communications and notes that as a result, "[a]dded service providers are guaranteed." DEAN WITTER, TELECOMMUNICATIONS INDUSTRY: THE ERODING MONOPOLY 5 (Mar. 20, 1991).

Yet another knowledgeable observer recently cited projections of 80-90 million wireless subscribers by the year 2004.[155] This observer committed his company to "build an integrated wireless strategy [] that will be able to reach virtually every American who wants wireless service"[156] in that time frame. Who was this man? -- MCI Chairman and CEO, Bert Roberts.

Wireless Costs. -- The AT&T/MCI Report attributes a large percentage of the cost of deploying cellular to compete with landline to the supposed shortage of capacity.[157] In analyzing the costs of PCS, the Report arrives at a much higher figure than most other analysts.[158] The Report also simply sets aside the fact that converting cellular services to digital will sharply lower costs across the board.[159] This is as if one had analyzed the future of computing in 1978, while ignoring the new-fangled microprocessor.

In sharp contrast, a Hughes Network Systems Report based on a case study that modeled an example of a digital cellular fixed wireless system in urban Mexico reported that the system carried a traffic load of 0.14 erlangs per subscriber (about the same load that in the Report necessitates a prohibitive radio site investment),[160] at a cost almost identical to wireline service.[161] In the parallel rural case study, fixed wireless proved to be significantly more economical than wireline.[162]

The AT&T/MCI Report likewise ignores the analysis of wireless costs set out in George Calhoun's landmark book, *Wireless Access and the Local Telephone Network.* Calhoun's study, the most comprehensive of its kind, reaches conclusions diametrically opposite to those set out in the AT&T/MCI Report. "The introduction of radio technologies into the long-distance segment of the telecommunications

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[155]*MCI Will Invest $1.3 Billion in Nextel to Offer Nationally Branded Wireless Services*, PR NEWSWIRE, Feb. 28, 1994.

[156]*Ibid.*

[157]AT&T/MCI REPORT at 91.

[158]In an FCC Working Paper on the Subject, David Reed estimates the capital costs of a PCS network, including handset, to be $703 per subscriber. DAVID REED, OFFICE OF PLANS AND POLICY, FCC, PUTTING IT ALL TOGETHER: THE COST STRUCTURE OF PERSONAL COMMUNICATIONS SERVICES vi (Nov. 1992). The Report's estimate of $1,100 is greater than 50 percent more than this. AT&T/MCI REPORT at 89.

[159]AT&T/MCI REPORT at 89, 92.

[160]*Id.* at 78, 91.

[161]Dr. Arunas G. Slekys, *High Capacity Digital Cellular for Wireless Telephony*, HUGHES NETWORK SYSTEMS, Oct. 1993, at 12.

[162]*Ibid.*

market in the 1950s led directly to the breakup of the monopoly for long-distance services," Calhoun writes. "Wireless access will work the same transformation in the local exchange market."[163]

Calhoun's book systematically compares the economics of copper and radio. His major conclusions are:

> (1) While wireline costs are fairly mature, radio-based access costs can be expected to drop by at least 50 percent or so over the next five years.[164]
>
> (2) The ratio of highest cost to lowest cost for radio is only two to one while it is ten to one for copper.[165]
>
> (3) Radio costs are not distance sensitive; copper costs are. This has particularly important (and favorable) implications for service to rural areas.
>
> (4) Favorable population densities are lower for radio than for copper.
>
> (5) There is much less risk of stranded investment with radio.
>
> (6) Radio has a positive salvage value; copper's is zero or negative.
>
> (7) Maintenance costs for radio are half of those for copper.[166]

By contrast with this careful analysis, the AT&T/MCI Report supplies only a cursory, and mostly qualitative, description of the savings available from wireless technologies.

Here again, the AT&T/MCI Report also ignores the major economic synergies on which the wireless industry will be built. The Report says only that "there are small but quantifiable advantages to be gained from the PCS on cable combination."[167] In fact, combining PCS and cable (or existing wireless systems

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[163]GEORGE CALHOUN, WIRELESS ACCESS AND THE LOCAL TELEPHONE NETWORK 40.

[164]*Id.* at 547. Indeed, the cost estimates in the AT&T/MCI Report are half of Calhoun's estimate from 1991 and fall below Calhoun's average first cost estimate for copper of $1,500 to $1,800. AT&T/MCI REPORT at ixv, 89.

[165]GEORGE CALHOUN, WIRELESS ACCESS AND THE LOCAL TELEPHONE NETWORK 550.

[166]*Ibid.*

[167]AT&T/MCI REPORT at 95-96.

for that matter) can reduce annual operations expenses by 14 percent.[168] For a PCS-only system like that analyzed in the AT&T/MCI Report, a 20 percent penetration rate would be needed to reach the fullest possible scale economies;[169] for a joint cable-PCS system, only a 10 percent penetration would be needed.[170]

The market has already accepted what the AT&T/MCI Report denies. Cable-CAP consortia are already allying themselves with providers of cellular and PCS radio services.[171] Fully 17 percent of the PCS applications the FCC has received over the last four years have come from cable companies.[172] Cable companies now account for more of the experimental licenses issued by the FCC than all seven Regional Bell companies combined.[173]

The economic reasons are apparent. In the radio world, the "LATA" is the individual mobile switch or (arguably) even the individual cell or wireless private branch exchange (PBX). Beyond that, everything is "interexchange." Traffic can be picked up directly by CAPs, cable television companies (which are also in the trunking business), or long-distance carriers themselves. This is precisely how the new-generation radio networks are being assembled. The high-capacity trunks that cable-CAP companies operate are perfectly suited to serve as backbone networks; they can knit together cell sites and mobile switches, link mobile switches into local and

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[168] *The Personal Touch*, THE ECONOMIST, Oct. 23, 1993, at 13. As George Calhoun writes, "Increasingly, network strategists are thinking in terms of how fiber and radio cannot simply coexist, but may truly complement one another in the broad modernization of the access network." GEORGE CALHOUN, WIRELESS ACCESS AND THE LOCAL TELEPHONE NETWORK 550. Calhoun also states: "Fiber in the local loop is only cost effective, however, for clusters of lines * * * [and] for large and medium sized businesses. For residential users, however, it only makes sense to take fiber to the street end and connect a number of customers to a box at the end of the street * * * For this last 100 meters to 200 meters [one] could use copper or * * * radio tails. Well over half the costs of a typical local telephone operation are associated with the maintenance of copper cables * * * Radio tails would avoid these costs." *Id.* at 552-553, (internal citation omitted). *See also* Peter Purton, *Radio over Fiber?*, TELEPHONY, Nov. 1989.

[169] *The Personal Touch*, THE ECONOMIST, Oct. 23, 1993, at 13.

[170] *Ibid.*

[171] Sixty-five cable television companies have formed Cable Television Laboratories, an information-sharing alliance with P.C.N. America. Andrews, *Cable TV in Phone Challenge*, N.Y. TIMES, Feb. 28, 1991, at D1.

[172] OFFICE OF ENGINEERING AND TECHNOLOGY, FCC, PCS EXPERIMENTAL APPLICATIONS BY FILED DATE (Aug. 11, 1993).

[173] *Ibid.*

regional networks and connect them to long-distance carriers.[174] The cable-CAP-PCS alliances will allow backbone facilities to provide multiple uses for data, video and telephony, which means a high degree of joint costs. This, in turn, means a lower unit cost for any one service, which the Report fails to recognize.

These cable-CAP-PCS ventures have already progressed far beyond the drawing board. The first PCS call in the U.S. to use cable plant for a portion of the transport was placed on February 12, 1992, from the President of Cox Enterprises to former FCC Chairman, Al Sikes.[175] Many observers agree that cable TV companies are aggressively deploying fiber-optic lines because they are looking beyond ordinary television to such uses as backbone networks for PCS.[176] The cable-CAP-radio alliances are very favorably positioned. Fiber in the higher reaches of the network, and radio in the lower, offers a promising combination of customer convenience and provider economy.[177]

Wireless Quality and Reliability. -- The AT&T/MCI Report is equally far off the mark in maintaining that wireless services simply do not offer satisfactory quality or reliability and will have to make enormous investments in order to induce customers to switch from the LEC.[178] Both AT&T and MCI have said precisely the opposite in other public pronouncements.[179] Their views are shared by Motorola, the

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[174]PacTel Cellular Detroit, for example, uses a combination of leased fiber and microwave for its network and has replaced some BOC-provided local loop circuits with leased cable TV fiber to ICs' facilities.

[175]Fred Dawson, *The PCS Puzzle,* CABLEVISION, June 1, 1992, at 33; *see also* TELECOMMUNICATIONS REPORTS, Feb. 17, 1992, at 45; *PCS Schooling,* CABLEVISION, May 4, 1992, at 42.

[176]J. GROSS, DONALDSON, LUFKIN & JENRETTE, INDUSTRY REPORT NO. 1226863, LOCAL TELEPHONE COMPETITION (May 18, 1992). R. Sukow, *It's Cable vs. Telcos, Again, on PCS,* BROADCASTING, Jan. 28, 1991, at 53 ("'Cable television operators who have installed fiber optic cables to upgrade their systems will be well positioned to provide low-cost interconnection between PCN microcells,' said TeleCable Corp."). *Rx For Tough Times,* CABLEVISION, Jan. 14, 1991, at 17 (remarks of Bill Johnson, Pres., Scientific-Atlanta: "The fiber-to-the-serving-area type of architectures we can put in today are designed * * * to make it very easy to migrate to the * * * incorporation of PCN-type networks."). Fred Dawson, *Mapping Fiber's Path,* CABLEVISION, Aug. 12, 1991, at 18 ("Over the long term, they also expect that future spectrum requirements will include transmission of PCS and low- and high-speed data for interactive services. It also allows for a third fiber to carry the PCS and data traffic.").

[177]GEORGE CALHOUN, WIRELESS ACCESS AND THE LOCAL TELEPHONE NETWORK 550-551.

[178]The report states that, "[i]ndustry sources have estimated the overall sales and marketing costs at approximately $900 per new cellular customer added" but did not identify a source for this figure. AT&T/MCI REPORT at 141.

[179]"AT&T has pioneered new wireless services from the beginning of radio broadcasting through the present. Request for a Pioneer's Preference at 14, *In re* Request of AT&T for a Pioneer's Preference Concerning Personal Communications System, No. 90-314 (F.C.C. May 4, 1992). "Signaling and database capabilities critical to PCS will be supported by the nationwide AT&T