

CONTROL OF TELEPHONES: THE CANADIAN EXPERIENCE

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The doctrine of the "technological imperative" is examined critically in terms of the historical development of Canadian telephone, cable, and satellite industries.

La "doctrine de l'impératif technologique" est analysée en fonction du développement historique du téléphone, du câble et des industries par satellite canadiens.

Introduction

In popular literature on new media (Toffler, 1981; Naisbitt, 1984), in academic literature on the Information Revolution (Bell, 1979; Porat, 1978; Irwin, 1984), and most significantly in policy documents from the Government of Canada, a recurring theme is evident: technological imperative, the doctrine maintaining that technology's march is largely inevitable, autonomous, foreordained (Winner, 1977). In Canada, foremost among proselytizers of the doctrine of technological imperative, have been senior civil servants Shirley Serafini and Michel Andrieu, whose widely-read tome, *The Information Revolution and Its Implications for Canada* (1981), declared:

Like the industrial revolution, the information revolution is unavoidable (13);

Canada has no choice but to promote vigorously introduction of the new technology (96);

[The Information Revolution] is a worldwide phenomenon causing structural changes in the economies of all countries, regardless of national differences in institutional arrangements or public policies (20);

[Canadians face] the technological imperative itself (27).

Serafini and Andrieu do not stand alone among the Canadian policy-making elite. Other governmental soothsayers have also endorsed enthusiastically the doctrine of technological inevitability: Arthur J. Cordell (1985), Francis Fox (1983), the Telecommission (1971) and the Science Council (1982), among others. This doctrine of the technological imperative, it is to be noted, provides a veneer of inevitability, naturalness, and hence goodness to technological developments and deployment that otherwise might raise questions concerning the distribution of political and economic power, cultural change, environmental impact, investment priorities and so on. Such questions become academic, however, as soon as one subscribes to a doctrine of

technological inevitability. As well the technological imperative neatly absolves the wielders of technique of responsibility for outcomes. What is, after all, must be. In this context it is most instructive to recall remarks of Roland Barthes, who wrote:

Myth deprives the object of which it speaks of all History. In it, history evaporates... Nothing is produced, nothing is chosen: all one has to do is possess these new objects from which all soiling trace of origin or choice has been removed. This miraculous evaporation of all history is another form of a concept common to most bourgeois myths: the irresponsibility of man (Barthes, 1972: 151).

The present paper endeavours to re-introduce this same "soiling trace of origin or choice". By drawing upon a range of evidence from Canadian telecommunications history, including local and interexchange telephone service, cable television and communication satellites, one of the most pernicious myths of our day, namely the technological imperative, is dispelled. The paper demonstrates that governmental policy-makers and more particularly corporate powerplayers have been instrumental in shaping Canadian telecommunications infrastructure; mere technology has been largely passive. Human responsibility for outcomes is hence reasserted.

Telephony: Prior To Regulation

Canadian telecommunications is currently dominated by one company, Bell Canada. Federally regulated, it was formerly parent of the Bell Canada Group but in 1983, through a controversial corporate reorganization, became a wholly-owned subsidiary of Bell Canada Enterprises Inc. In 1985 BCE amassed revenues of \$13.3 billion from a diverse array of activities ranging from pipelines to publishing. But at the core of this corporate complex squarely stands one company, Bell Canada, and it is to the emergence of that corporate entity that we now turn.

Bell Canada (or the Bell Telephone Company of Canada as it was then known) was incorporated in 1880 by federal charter on behalf of agents of the National Bell Telephone Company of Boston, Mass. Earlier that year National Bell secured Canadian rights to Alexander Graham Bell's remarkable invention (Patten, 1926) and so its hegemony in Canada seemed assured. Although the patent was declared void in 1885, for the next 100 years the Charter endured, permitting the Company *inter alia* to string lines along all public rights of way, thereby constituting an important albeit imperfect instrument for monopolization.

Beginning in 1893 when telephone patents expired in the U.S.A., helping inaugurate an American independent telephone industry (Gabel, 1969), Canadian independents started springing up too. Between 1892 and 1905 in Ontario alone some 83 independent came into existence (Grindlay, 1974: 254-305). They generally relied on U.S. manufacturers for equipment since Bell and its manufacturing subsidiary, The Northern Electric and Manufacturing Company, were less than enthusiastic purveyors

of telecommunications equipment to these interlopers. Indeed entry by independents gave rise to a flurry of anticompetitive activity on the part of Bell, carefully designed to stall and, if possible, reverse growth of the insurgents. In the case of multiparty rural lines, for example, Bell often granted urban interconnections but only on condition that Bell be afforded control over all further connections; sometimes Bell interconnected with one company to eliminate connections for others, a ploy to put the latter out of business (House of Commons, 1905: 238-241). Predatory pricing was well-honed as an anticompetitive tactic also. In communities like Sherbrooke, Peterborough, Port Arthur and Fort William free service served admirably to harrass competitors (House of Commons 1905: 77-98, 680); in Montreal too prices were shaved to rock bottom as a competitive response.

Beginning in 1891 and continuing until 1909 when finally outlawed by the Board of Railway Commissioners for Canada, Bell secured agreement from major railroads to exclude independents from railway stations and rights of way (House of Commons 1905: 179-209). Furthermore Bell procured exclusive franchises from municipalities (30 of them by 1905) by promising not to increase rates for the life of the agreements (House of Commons 1905: 660). Exclusionary tactics such as these, coupled with perceived excessively high rates and lack of rural service, eventually resulted in the inauguration of federal regulation, beginning in 1906 (*Railway Act*, S.C.6 Edw. VII, c.42).

Years of Regulation

Among the powers granted the Board of Railway Commissioners in 1906 was oversight of connections between Bell and other companies. From 1906 to the 1950's the main interconnection issue concerned Bell's relations with predominantly local telephone companies. Since the 1950's, however, interconnection controversies have embraced cable television and rival long distance carriers as well. This section addresses all these instances, and also terminal interconnection, the attachment of customer-owned ("foreign") terminal devices.

Interconnections With Local Telephone Companies

Between 1906 and 1915 some 676 independent telephone companies were established in Ontario. Growth was so dramatic that by 1915 independents accounted for nearly one third of Ontario's telephones, a level never since equalled (Rural Telephone Committee, 1953: Exhibit 2). Despite regulation, Bell succeeded in halting, then reversing, the growth of independents, first through long distance interconnection and pricing policies and then subsequently through local exchange pricing policies, ultimately absorbing most of them. Indeed Bell bought up 160 Ontario independents between 1950 and 1959 and an additional 218 between 1960 and 1975 (Ontario Telephone Service Commission, 1977: 186). These takeovers are explained by noting pricing tactics employed by the carrier and the sequence of rulings handed down by Bell's federal regulator.

From the onset of competition to the 1920's Bell claimed long distance (toll) service was unprofitable and was being cross-subsidized by local service (see 53 Can. S.C.R. 503, 1915). This contention is supported by noting that pressures for entry at the time were primarily into local service, not long distance. As long as Bell retained discretion over long distance connections, this pricing strategy made sense. It allowed the company to retain high local rates despite direct competition. Rivals, after all, were handicapped by having few if any long distance lines. The pricing strategy also dissuaded competitive entry into long distance.

Once Bell was required by its regulator to afford even competing companies connections to long distance however, (*Rural Telephone Cos. v. Bell Telephone Co.*, 12 Can. Ry. Cas. 319, 1912), this form of non-compensatory pricing became less expedient. Indeed, Bell found itself in the undesirable position of *subsidizing* its competition! Consequently, by the turn of the decade, Bell had implemented its first phase of "rate rebalancing", reversing the loss/profit relationship between long distance and local whereupon independents began to subsidize *Bell* for their use of long distance. "Rebalancing" reached such immense proportions by 1979 that Bell declared its cost to be \$1.32 to produce \$1.00 in local exchange revenues but only \$0.31 to produce \$1.00 in toll (CRTC 1979a: 216).

Phase One "Rebalancing", then, had two consequences as regards the structuring of the telephone industry. First, it created a severe financial strain on independent companies now pressured into charging non compensatory local rates and unable to share (adequately) in toll revenues (CRTC, 1978; 31). Second, it created incentives for entry into long distance by other carriers. We discuss the first result immediately, and the second later on in this paper.

Independent telephone companies suffered under the first round of "rate rebalancing". However, since all agreements between Bell and the independents were subject to regulatory approval, the Commissioners of the day played an important role in the demise of independent companies. The record clearly reveals a lack of concern on their part. In a 1951 decision approving a toll-sharing agreement between Bell and "line haul companies" (companies owning some long distance lines), for example, the Board of Transport Commissioners emphasized that it had "no responsibility for the revenue plight of companies not subject to our jurisdiction" (Board of Transport Commissioners, 1951). Likewise in 1954 the Board reiterated that it was "not responsible for the financial welfare of such companies" (Board of Transport Commissioners, 1954). Here Union Telephone Company, which lacked toll lines of its own, had applied to share more adequately in long distance revenues generated by calls originated by it. Union argued it should at least be compensated for expenses incurred in billing its subscribers and for use of equipment provided by Union which was used jointly for local and toll traffic. The Board, however, in dismissing the application, adopted the so-called "board-to-board" method of cost allocations,

whereby it is assumed that local switching, local distribution and telephone instruments are not used in long distance calls and hence warrant no compensation.

Only after 1976, the date when federal jurisdiction over telecommunications was transferred to the Canadian Radio-television and Telecommunications Commission, did such outrageous rulings get reversed (CRTC, 1979b). Unfortunately, the new sympathetic treatment by the regulator toward independent telephone companies came many years too late, since most independents had long since passed into oblivion. Nonetheless in Ontario today some 30 independent companies survive, providing in 1985, 179,000 of the province's telephones (Ontario Telephone Service Commission, 1986: 13), a small but persuasive reminder that a substantially different industry structure could now be in place.

Cable Television Interconnection

Analogous to Bell's harsh treatment of independent telephone companies has been its interaction with another locally-based telecommunication industry, the cable television industry. Although precluded by its charter, as amended, from running cable television systems, Bell exerted effective control over the industry through contractual restrictions, beginning with the inception of the industry in the early 1950's and continuing until 1977. Bell's interest in restricting cable is obvious. The message carrying capacity of the coaxial cable used in cable systems is over 300 times greater than the copper pair wire (or local loops) used by Bell to connect the telephone instrument to the local exchange. Unrestricted, cable systems could prove to be formidable competition for Bell.

The cable industry since its inception has been dependent on telephone companies for access to poles, ducts and rights of way. In order to minimize competitive incursions, Bell Telephone (and some, but not all other Canadian telephone companies) offered access to poles and ducts only under highly restrictive conditions. Under Bell's "partial system agreement" cable companies were required to contract with Bell to construct their systems; were required to pay for the labour and materials used in construction; and then were required to lease the facilities back from Bell. Bell, in other words, refused to allow cables owned by cable companies on its poles and over its rights of way (Babe, 1974: 187-225). Since Bell owned the cable it was also in a position to restrict the types of messages that could be transported. Typical prohibitions included:

- (1) preclusion of material not part of, or ancillary to broadcasts or cablecasts;
- (2) messages for distribution point-to-point or to only a portion of the network; thereby pay television and certain educational and industrial programming were forbidden;
- (3) bidirectional messages and conversations; and

- (4) facilities used in conjunction with, or interconnected to, the telephone switching centre. (Babe, 1974: 209).

On appeal in 1975, the Canadian Transport Commission (CTC) ruled that one cable company, namely Transvision (Magog) Inc., should be allowed to attach its own cable to Bell's poles (Canadian Transport Commission, 1975a). Then in 1977, having assumed telecommunications jurisdiction from the CTC, the CRTC passed a general ruling whereby licensed cable companies could attach their own cables to Bell's poles (CRTC, 1977a). Rates for pole attachments since that time have been set by the Commission to prevent monopoly pricing. As a result the cable industry in recent years has been offering pay television and some companies are providing alarm, meter reading and other services that had been banned under the "partial system agreement". In the years to come cable television may well become competitive in other services, such as electronic banking and electronic publishing (videotext). It is to be noted that the status of cable vis-a-vis the telephone industry has depended more on regulatory policy and contractual arrangements than upon the technologies in question.

Terminal Interconnection

A century-old claim undergirding "natural monopoly" in Canadian telecommunications has been the notion of systemic integrity, the belief that network performance could be maintained only through centralized administration of end-to-end operations. By analogy to the weak link in the chain, telephone companies contended that subscriber-owned equipment would pollute the system with malfunctioning equipment. In 1968, however, Parliament reduced Bell's authority to ban subscriber-owned equipment by revising the Bell Charter, empowering the Canadian Transport Commission to become final arbiter regarding the "reasonableness" of Bell's "requirements" for the attachment of customer-owned equipment.

In 1975 Dr. Morton Shulman, millionaire stock speculator, author, former coroner and maverick M.P.P. in Ontario's Parliament complained to the CTC that Bell had disconnected his phone in the provincial legislature. Bell countered that Dr. Shulman had illegally attached his own terminal to Bell's line, that Bell had drawn up no "requirements" for such attachment. With impeccable logic the CTC agreed with Bell, ruling that since Bell had published no "requirement" there was "no such requirement before the Commission which the Commission could judge to be reasonable or not." Thereupon, the case was dismissed, the CTC maintaining "we have no jurisdiction to grant the relief sought in the case" (CTC, 1975b).

Challenge Communications Ltd. fared better once telecommunications jurisdiction had been transferred to the CRTC in 1976. Challenge Communications was a mobile telephone carrier competing with Bell, but it required access to Bell's network to complete its service. In 1977 Bell unilaterally announced that mobile telephone customers leasing dial telephones from companies other than Bell would

not be connected to Bell's switched network. Bell justified this exclusion on grounds of systemic integrity. In oral proceedings, however, a less sublime reason came to light, proffered by none other than Bell's normally crafty counsel, Ernie Saunders:

Having gone to the trouble to take the steps to make this service available to the public, Bell Canada quite understandably desires to reap the benefits of this new offering. (CRTC, 1977b: 15).

The Commission, while perhaps marvelling at Sanders' candor, nonetheless ruled the tariff to be illegal, conferring as it did undue preference and unjust discrimination in Bell's favour. The decision was subsequently ratified, on appeal, by the Federal Court of Appeal (Kaiser, 1981). Rebuffed by the courts and regulator alike, Bell Canada filed an application in November 1979 requesting the CRTC to make a general ruling on the extent to which attachment of customer-owned equipment was in the public interest. During the ensuing hearings neither Bell nor BC Tel invoked the now-outworn shibboleth of "systemic integrity." Indeed both companies agreed that provisioning of all terminals should henceforth be on a competitive basis (CRTC, 1982: 32).

Long Distance Interconnection

As noted above the first era of "rate rebalancing" created incentives for entry into long distance markets by independent carriers. This section describes Bell's relations with three rival long distance carriers: Northern Telephone Company, CNCP Telecommunications and Telesat Canada.

Northern Telephone Company

In 1964 the town of Kenora, which operated a municipal telephone system and Northern Telephone Limited servicing 150 communities or settlements in Northern Ontario and adjacent regions of Quebec, jointly applied for an Order of the Board of Transport Commissioners to require Bell Canada to provide the applicants with toll interconnection at Fort William to enable Northern to transmit long distance telephone calls between Kenora and Fort William in place of (or in competition with) Bell. While the local exchanges and distribution facilities in Fort William were owned by the municipality, Bell controlled the toll switching centre and hence toll connections. In support of its application Northern stated that Bell Telephone had always neglected northern regions, noting that even to that time Bell still owned no long distance transmission facilities between the two communities, merely leasing circuits from Canadian Pacific Telegraphs. Northern also stated that toll revenues generated by approval of the application would enable it to lower local rates and upgrade service throughout its sparsely settled territory. The Board, however, saw things differently, ruling that approval of the application would cause a revenue fall for Bell of between \$150,000 and \$300,000 per year, an undesirable occurrence in the Board's view. The Board thereupon denied the application stating "the fact that a competing carrier is

prepared to offer more is not a ground for substituting it for the existing carrier" (Board of Transport Commissioners, 1964). Bell acquired Northern Telephone in 1966.

CNCP Telecommunications

On 14 June 1976, Canadian Pacific Ltd. applied to the CRTC to order Bell Canada to interconnect CP's telecommunication system to Bell's switching network. For many years CNCP Telecommunications had been offering services competitive to some services of Bell Canada and the consortium of telephone companies known as the TransCanada Telephone System (TCTS), today called Telecom Canada. However TCTS members possessed the important advantage of owning and controlling the local switched distribution facilities, agreed by CNCP to be properly monopolized. CNCP therefore faced a significant competitive disadvantage in being excluded from such facilities. While CNCP was permitted to lease local distribution facilities (local loops) on a "dedicated" (unswitched, or point to point) basis from TCTS members, enabling CNCP to connect business customers with its own offices and to its own long distance network, it was prohibited from interconnecting with telephone switching centres and with those customer-owned terminals which were in turn connected to TCTS switching offices. The result was that CNCP was limited to providing private line services and the limited amount of switched services that its own switching and distribution facilities could handle. Thousands of small businesses were thereby foreclosed from CNCP's offerings since the leasing of dedicated local loops could be justified only by institutions with high volumes of telecommunications traffic.

In weighing arguments on both sides the CRTC departed significantly from positions established previously by the Canadian Transport Commission and its predecessors. Whereas the Board of Transport Commissioners had asserted that the Board was "not responsible for the financial welfare" of companies not under its jurisdiction, the CRTC stated that it was required to take a wide view of its obligations to protect the public interest and that, in particular, it would consider the indirect effects of granting the application upon subscribers to other telephone systems, such as those in the Maritime and Prairie provinces (CRTC, 1979a: 102-5). Furthermore, the Commission ruled, again in contrast to the precedent established in the *Northern Telephone case*, that CNCP was required to make a prima facie case only, namely that access to Bell's facilities would be useful to CNCP, that duplication of such facilities would not be in the public interest; and that "no unreasonable technical harm would result from the interconnection" (CRTC, 1979a: 127).

Reviewing the evidence, the CRTC concluded that Bell had grossly over-stated the revenue erosion effect of interconnection. The Commission estimated "as an upper limit" the revenue loss to BELL in 1982 from interconnection to be no more than \$45.7 million, as opposed to the \$253.3 million Bell had estimated (CRTC, 1979a: 186, 140). Furthermore, the CRTC stated that "Bell failed to provide adequate empirical evidence to support its contentions regarding the nature and extent of any economies

of scale enjoyed by it" (CRTC, 1979a: 241). On the other hand the Commission foresaw substantial benefits from interconnection. "The evidence in this case indicates that competition would be greatly enhanced with interconnection and that interconnection would provide significant benefits to users in terms of improved responsiveness, particularly on the part of the telephone company, in satisfying their telecommunications requirements" (CRTC, 1979a: 241-2). Thereupon Bell was ordered to interconnect CNCP for certain private line voice and data transmission services, and a more competitive era was foreseen.

CNCP, however, was unsuccessful in a subsequent application filed in 1983 to extend the range of authorized, interconnected services to include long distance voice, principally Message Toll Service (MTS) and Wide Area Telephone Service (WATS). Even while applying the criteria used in its previous interconnection decision, the CRTC concluded in this instance that "the granting of CNCP's application would not be in the public interest" (CRTC, 1985: 43). On the one hand, the CRTC stated, if CNCP were required to make contributions to help Bell maintain low (non-compensatory) local telephone rates, it was unlikely that CNCP would ever be profitable. On the other hand, if such contributions were not required, the toll subsidy to local service currently provided by Bell would inevitably decline due to competitive pricing of toll, resulting in an undue escalation in local rates. Low local rates had, in the years subsequent to being introduced to eliminate independent telephone companies, become a matter of social policy to foster universal telephone service. This desirable goal notwithstanding, it may be noted that Bell used this second CNCP proceeding to advance its proposal to once more "rebalance rates", this time by sharply reducing long distance prices to erase incentives for long distance entry, and by doubling local rates. Bell estimated the effect of phase two "rebalancing" could be to deprive 400,000 of its customers of local telephone service (Canadian Press, 1984: 2).

Telesat Canada

Turning finally to Telesat Canada, it becomes again apparent that technology *per se* has dictated no particular market structure. Telesat Canada was created by Act of Parliament in 1969, an outcome of recommendations contained in the *White Paper on Domestic Satellite Communications System for Canada* (1968). In rejecting proposals by TCTS to themselves own, control and finance satellites as part of an integrated, terrestrial/space telecommunications system the *White Paper* took the position that satellites should be able "to compete effectively in those areas where competition is appropriate". The government also rejected proposals by TCTS that the member companies own all ground stations, a proposal designed to afford the telcos effective control (Dalfen, 1969). A further suggestion, that Telesat sell services only to designated common carriers, that is that Telesat become a "carriers' carrier", was also rejected.

Nonetheless, the government needed the co-operation of TCTS, anticipating that the telephone companies would be Telesat's largest customers. Therefore the government agreed to TCTS's demands that Telesat be allowed to lease only full RF channels, each with a capacity of 960 telephone circuits or one TV channel; that all leases be for continuous use; that five-year leases would be required; and that resale and/or sharing of channels by and among customers be prohibited (Golden, 1974). These restrictions each reduced Telesat's potential customer base to the carriers themselves and the CBC; the latter, as a crown corporation, was envisaged by the government as helping to keep Telesat afloat during the initial years.

Upon incorporation of Telesat the government and the carriers each subscribed to fifty percent of the shares with the possibility of allowing the general public to participate to the extent of one-third ownership at a future date. Between 1972 and 1976 three Anik "A" satellites were launched in the 4-6 GHz range; a fourth Anik "B" satellite, leased full-time to the Department of Communications, was also sent aloft; it operated in the 12-14 GHz range. While the three Anik "A" satellites had 12 transponders each, by 1976 Telesat found itself able to lease only one third of its capacity (CRTC, 1977b). Even the few channels that *were* leased were underutilized. Telesat was financially troubled, despite the public funding through CBC and Department of Communications. Moreover by 1975 there was some question whether TCTS would renew leases unless members could get full control over Telesat.

In these circumstances, Telesat and TCTS reached agreement whereby Telesat would become a member of the telephone consortium and in so doing would receive a guaranteed rate of return. In exchange Telesat agreed that earth stations would henceforth be operated by TCTS members and that Telesat would become a carriers' carrier, selling only to designated carriers. The agreement was approved hastily by the Department of Communications and was submitted for approval to the CRTC in early 1977. In rejecting the agreement the CRTC made the following observations, among others: (1) the guaranteed rate of return provision would make assessment of Telesat's rates difficult and would erode incentives for efficiency; (2) the agreement minimized advantages of satellite compared to terrestrial microwave since all facilities would be bundled together in setting distance-based prices; (3) there was likelihood of undue preference in favour of the telephone companies to the disadvantage of other carriers such as CNCP; and (4) there was a substantial lessening of competition.

On appeal, Cabinet however overturned the CRTC's decision (Department of Communications, 1977). The main reason cited for this reversal was that without the agreement the carriers were not expected to utilize Telesat to any great extent, throwing into question the future financial viability of satellites in Canada. Nonetheless the government did announce that the matter of earth station ownership and Telesat's policies of leasing only complete channels would be reviewed. The government's statement concluded that "Telesat is a complement to, not a competitor with, existing telecommunications carriers, and ... a closer association with these carriers must

develop if efficient, effective integration of satellite and terrestrial facilities is to be ensured, thereby making new services available to Canadians at the lowest possible cost."

Indeed, some of the more restrictive provisions of the original agreement have been relaxed since 1977. In 1979, the Communications Department announced that cable systems would be permitted to own ground stations. In 1981 the CRTC ruled that Telesat's customer base could no longer be restricted to authorized common carriers and that Telesat's policy of providing only full period RF channels to its customers was unduly prejudicial, favouring large users (CRTC, 1981). Full implementation of this decision was waylaid for a time by another Cabinet reversal, however. Then, in 1984, the Commission required Telesat to permit licensed broadcasting undertakings to resell excess capacity to other such undertakings for broadcast programming purposes (CRTC, 1984). Finally, in May 1986 a revised connecting agreement between Telesat and Telecom Canada was approved by the Commission whereby Telesat's customer base was no longer to be restricted to broadcasting undertakings and specified common carriers; Telecom Canada's subsidies to Telesat were to cease as well, effective 1 January 1988 (CRTC, 1986).

Conclusions

By investigating closely pricing and interconnection arrangements in the Canadian telecommunications industry since 1880, one is struck by the wide range of conceivable industry structures that the various technologies have permitted. Telephones at one time were competitive at the local level; predatory pricing and long distance interconnection restrictions, however, eventually eliminated that competition. A thriving independent telephone industry at one time existed, but an inability to share adequately in toll revenues, plus a strategy initiated by the dominant company of pricing local service below cost, all but eliminated the independent industry.

Cable television, an alternative local distribution network, was at one time effectively controlled by the telephone industry. Regulatory rulings outlawing certain restrictive clauses in agreements between the two industries have in more recent years positioned cable to expand significantly the range of services offered the public. Telephone companies once enjoyed end-to-end monopolies. Attachment of customer-owned equipment, a commonplace today, was made possible only through court rulings and regulatory decisions. Although satellites were originally intended by the government to be distinct from the telephone industry, upon inception this technology was absorbed within the old industrial order. More recently, regulatory rulings may be freeing satellite from this grip and separating it as an alternative long haul carrier.

The histories of the relationship between Northern Telephone and CNCP on the one hand and the telephone industry on the other, also point to the variations in market structure that the technologies have permitted. These are important points to

remember in an era in which the shrill cry of the technological imperative is heard so often.

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