WHICH LOCAL SERVICE FOR THE INFORMATION HIGHWAY?

INTRODUCTION

Bell Canada is in the midst of a process to redefine its local service. This exercise is imperative because local service has traditionally operated at a deficit, and intensifying competition in long distance service is eroding the traditional source of funding, while competition is even entering the local service market.

Bell's prime objective therefore is to align local rates with costs. Bell plans to achieve this objective through three measures:
- huge increases in local rates;
- usage-sensitive pricing;
- pay-per-use regional service.

This upheaval is occurring against a backdrop of major technological shifts presiding over creation of the information highway. How can Bell redefine local service while building the information highway?

Many speakers have already established the link between the two topics at hearings of the Canadian Radio-Television and Telecommunications Commission (CRTC) hearings, voicing concern about the sources of funding for the Sirius project (Bell's information highway). Each in turn has demanded that Bell modernize its local network faster and that earnings from monopoly services (primarily local service) not be used to fund construction of the information highway (primarily the local network).

ROLE OF THE SCIENCETECH ANALYSIS

How can these contradictory demands be reconciled? Only a vision of the future will allow Bell to ensure that its view prevails. The purpose of the following pages is to identify the underlying contradictions in some of Bell's positions or policies.

We have presented our opinion with no "favourable prejudice" toward Bell. On the contrary, we have taken the approach of a professional industry observer, which therefore is critical.

1 - CURRENT SITUATION

1.1 - The Local Market

In long distance service, the revolution has already taken place. Now local service must face the music. Since this segment traditionally has run a deficit, the pressure for competition has been slow in coming.

Since the Telecom 94-19 decision on the regulatory framework for telecommunications companies, it is clear that the entire local market in Canada will soon be open to competition. Cable distributors are preparing to offer switched telephone and computer services. Hydro-Québec has indicated that it plans to enter the scene under an approach already tested in Britain and the United States. The imminent entry of four mobile telephone companies (Bell Mobility, Cantel, Microcell and Clearnet) will also help open local service to competition.

In computer communications, competition has already entered the local market. In Montreal, Lanser Telecom is already selling radio transmissions in packets consistent with the X.25 standard, in competition with Bell Canada. COGECO is offering Internet access via the cable network and Vidéotron will be quick to follow. Finally, the premier industry development of 1995 has been the explosion of Internet suppliers, rising from six at the start of the year to about a hundred at year-end just for Quebec.

1.2 - The General Information Highway Context

The Information Highway is all the rage! Everyone is going on-line in preparation for the arrival of new entertainment, electronic business, information and public (education-health) mass services. But two concepts are at odds.

The conflict does not lie in the general location, nor between the telecommunications and cable companies.

In fact, the telecommunications and cable companies share the same conception of the information highway as a range of new wide-band services deployed in a coordinated manner over their respective networks. The precursors of this model were known as Minitel in France and Alex in Canada. Today's versions are called Sirius (Bell) and UBI (Vidéotron).

The real opposition to the telecommunications-cable model comes from computer companies, which view the information highway as a series of standards based on which large or small creators can create their own services. This ultra-liberal, if not anarchist, concept has served as the platform for the only information highway prototype now in operation: the Internet.

1.2.1 - Internet Marketing

Telecommunications companies are still reluctant to recognize the Internet as the prototype for the information highway. As proof, Bell's advertising vaunts the benefits of the information highway, yet fails to mention the word "Internet" even once, nor the name "Sympatico".

The information highway is being built by computer companies in successive layers of software with names like TCP/IP, World Wide Web, Mosaic/Netscape, and tomorrow—who knows?—Java or Lotus Notes. The standards are implemented with no international coordination, in successive breakthroughs. Marketing strategy is reinvented by distributing software free of charge to capture the market. Services generally are free for the user, since the supplier is the one who pays.

What we call the Internet is this series of standards and marketing innovations that radically depart from traditional market laws.

ALERT 1

Any reform of local service by telecommunications companies will have to take Internet marketing strategy into account. If the new rate structure advocated by Bell continues to reflect solely the voice message context, this company will not be able to play a central role in construction of the information highway.

1.3 - The Threat of the Information Highway

"There is a general transition from telecommunications as discrete services and networks to a world of virtual reality running on Gigabit Network Platforms—described by some researchers as telecommunications disappearing into the backplane of a distributed worldwide computer"
Pekka Tarjanne, Secretary General, ITU

The traditional asset of telecommunications companies is the intelligence of their switched network. However, the information highway world is now injecting massive doses of intelligence into terminals. By imposing the microcomputer as the terminal of choice for the information highway, computer companies are cancelling out the historic advantage of telecommunications companies. From now on, the key to success is bandwidth, the race for vast capacity and transmission speed.

On the information highway, switching is handled by Internet supplier servers. Thousands of small businesses and even young students with no capital or formal training are taking over the "noble" activity of telecommunications companies. These companies will be left only with the role of "electron carriers". And they could lose even this modest status if they fail to modernize their access network.

The cable network is no better adapted to the information highway world than the telecommunications network but will be less expensive to modernize. In addition, no one can predict the role that will be played by mobile communications, wireless cable or low or medium-orbit satellite companies.

ALERT 2

Internet users are injecting increasing amounts of music and video into the telecommunications network. The result is a need to increase band width on the access network very quickly. If telecommunications companies do not do this, Internet users will switch to another network.

1.4 The New Liberal-Socialist Activism

The Internet is not only a network and a technology. It is the precursor of what will become the future information society. Before we proceed any further, we should point out the emergence of a form of social organization linked to the information highway that will take on growing importance for Bell's future.

A new form of activism bringing together consumer groups and industry lobbies is emerging in large part around the Internet. The flexibility and low cost of the Internet (associated with fax/modem technology) permit instantaneous mobilization of a large number of diverse socio-economic players around an *ad hoc* cause. The HALT phenomenon in July 1995 and RISC in December 1995 were forerunners of this new activism that integrates neo-liberal arguments into post-socialist practice.

This paradoxical coalition defies all the old left-right and federalist-nationalist categories. It is resolutely anti-government, but distances itself from Newt Gingrich-style conservatism, entrepreneurial but based on pragmatic social values, with "fuzzy" profiles that make it all the more formidable.

ALERT 3

There is every indication that the paradoxical coalition will mobilize with extreme virulence around all issues related to local service and, in particular, usage-sensitive pricing and obsolescence of the network, which directly affect access to the information highway. The Internet will be the crux of these battles because Internet suppliers and their subscribers have huge interests at stake.

2 - BELL'S OFFER

2.1 - Obsolescence of the Local Network

Bell, like all other telecommunications companies in the world, is grappling with a chronic deficit in local service.

The consequence of this deficit is that Bell's local network is in crisis. Quebec has 61,000 party lines and 285,000 lines served by analog switches.[1] Even in greater Montreal, many companies cannot obtain Centrex or ISDN service. At the same time, the media are touting little New Brunswick, which has a 100 percent digital network.

At a time when Bell is publishing its information highway project, local network obsolescence will quickly become a major obstacle to its claims of technological leadership. The resurgence in activism observed for usage-sensitive pricing and among Internet suppliers should also begin to bear on this issue as well (see "The New Activism").

ALERT 4!

If the new liberal-social activism makes obsolescence of the local network a war horse, political and regulatory intervention cannot be forestalled indefinitely. We must remember the precedent of non-urban service improvement (NUSI) in the late 1970s. This time, the public intervention could take a form much less favourable to Bell.

2.2 - The Poisoned History of Regional Service

In this local network, inequalities of service are compounded by regional service policy. Introduced in 1948, regional service expanded out of control during the 1950s and 1960s. A mayor or elected representative simply had to pressure Bell to obtain links between communities. Despite the introduction of objective criteria in the 1970s, regional service continues to suffer from its improvised genesis.

The result is that Bell has devoted enormous energy to regional service, undoubtedly unique in the world, which is a major source of lost earnings. Yet the number of malcontents continues to rise. In a word, today's regional service is an inconsistent service condemned to steadily rising costs that will generate dissatisfaction for diametrically opposed reasons: lack of access for one group and cost of an unused service for the other.

Bell has now resolved the regional service issue by casting off the straight-jacket of uniform service for all and replacing it with regional pay-per-use service. Everyone will choose the interexchange links included in their personalized basic service. This is the "Friends & Family" approach ingeniously adapted to the local market. In this way, Bell is responding directly to the aspirations and needs of its customers.

A SUCCESS?

If the new service is properly designed, it should transform an old problem into a business opportunity and allow Bell to win on every level: earn new revenue, eliminate the erosion of long-distance service and satisfy its customers.

2.3 - The Mini-crisis of Rate Increases

Bell is tackling the problem of the local service deficit by raising the basic rate. Local service increases have been approved with a one-year delay due to opposition by consumer associations and competing long distance companies. This paradoxical coalition was limited on the business side, however, to a single sector (long distance competitors).

It is surprising that this coalition achieved this result for such a "weak" cause. Local rates had not risen for 12 years. The increase in local rates was minor compared with the general rise in the cost of living and the successive declines in long distance rates over the same 12 years. This increase normally should have gone through without "making too many waves".

A SUCCESS?

The rise in local service rates is only a mitigated success, obtained with a one-year delay under difficult conditions, which presages coming problems for Bell in the area of local rates. The least misstep could derail the whole process.

2.4 - The Crisis of Usage-Sensitive Pricing

The subject of usage-sensitive pricing is quite another matter. When Bell wanted to introduce usage-sensitive rates for local business-line service, thousands of faxes and Internet messages forced Bell to backpedal in July 1995. The paradoxical coalition of consumer groups and business lobbies reached unprecedented size.

In 1996, Bell has resumed the offensive on usage-sensitive pricing, this time for business and residential service. This pairing is unfortunate because the significant differences that exist between the two proposals will escape the public's notice. People will forget that Bell wants to protect small users from local rate increases and give them a greater choice of rate options, and remember only Bell's "bad faith", the "rationing" of telecommunications and the risks of social exclusion.

2.4.1 - Bell's "bad faith"

Bell's argument that it is not seeking new revenue is particularly ill-advised.[2]

If Bell in fact were not seeking new revenue yet persisted in introducing a system that united opposition, the policy would be pointless. By contrast, if Bell were actually seeking new revenue yet claiming the opposite, its policy would be based on a lie.

In actual fact, everyone knows that the upward trend in the number of minutes per line would quickly increase Bell's revenue. The claim that Bell is not increasing its revenue by introducing a form of usage-sensitive pricing therefore will be challenged.

2.4.2 - "Rationing" of Telecommunications

Usage-sensitive local service pricing is a totally foreign concept in North America. In the few areas in the United States where it does exist, it was introduced at the turn of the century. In all areas where it was introduced in the 1980s, this structure is optional. In one state, it even had to be withdrawn in the early 1990s because it generated such hostility.

In Canada, there has never been a usage-sensitive rate structure, except briefly in Manitoba in 1911 and Nova Scotia in 1919. Bell did attempt the same thing in 1920, but was dismissed by the Board of Railway Commissioners.

Pay-per-use local service is a concept associated with postal and telecommunications authorities in Europe and the Third World. Where it does exist in North America, it is merely a holdover from the days when telephones were a rare commodity.

In modern telecommunications, cellular telephones are the medium best suited to pay-per-use service. This is a supplementary service, however, that cannot be compared with

conventional telephone service. In Britain, when Mercury One-2-One launched personal mobile telephone service (PCS) in September 1993, it offered a service that included free local calling periods on evenings and weekends.

The Mercury One-2-One service triggered a veritable revolution in Britain, where local calls on conventional telephones are subject to a charge at all times. The "free" local calling feature was presented by Mercury One-2-One as a strategic tool that would enable it to make personal mobile telephones the modern substitute for the old conventional pay-per-use telephone.

2.4.3 - Social Exclusion

Some studies of universal access to telephone service show that the most frequent causes of disconnection are pay-per-use long distance charges. Immigrants and young people heading single-parent families are the main victims of this inability to control long distance charges.

By introducing usage-sensitive pricing to local service, especially in the residential market, Bell is dangling a threat over groups of people it is claiming to help. Of course, Bell claims that its pay-per-use rate plan is optional, but everyone will view this as the "thin edge of the wedge" to gain acceptance of this concept before subsequently making it mandatory.

ALERT 5!

The usage-sensitive pricing policy therefore threatens to permanently consolidate the liberal-socialist coalition around the issues of bad faith, antiquated rationing and social exclusion. The issue is not only whether Bell can win out over this coalition, but also at what price.

3 - THE NEW RATE STRUCTURE PARADIGM

Telecommunications specialist George Gilder stated in September 1995 at the TeleCon 95 convention organized in Vancouver by the CBTA that "Business should be worried less about solving problems and focus on pursuing business opportunities."

Rather than seek to introduce the foreign and outmoded concept of pay-per-use local service, Bell should focus its attention on new approaches. What is the path to the future of telecommunications? Building the information highway. Any rate reform must take into account the needs of the future information highway.

The prime characteristic of the information highway is that voice communications will form only a small component of this sector. The highway will be dominated by video and computer data. Thus it would be normal to study rate structures for video and computer data.

3.1 - The Video Model

Cable distributors establish basic service on access to a certain number of channels. Additional channels are sold in packages. Cable distributors plan to introduce a pay-per-view service in which consumers would pay for the programs they watch. There is no charge based on distance.

3.2 - The Computer Model

The dominant model is the Internet, where rates are based on two criteria: access and user time. "Dial-up" access costs less than continuous access and a 14.4/28.8 kb/s link is less expensive than an ISDN (128 kb/s) link. Internet suppliers generally sell a package of 20 to 30 hours with basic access, beyond which time is billed by the hour. There is no charge for distance.

Minitel is the other model of on-line computer service. It was developed in a pay-per-use local rate environment, but there is a difference between the French and Canadian situations. Minitel was sold by France Telecom as part of a comprehensive strategy that included a free terminal and a free electronic directory service. At the time, these two free features constituted a bold change in rate structures and paved the way to Minitel's success.

3.3 - Distance: Technological Heresy...

In an information highway environment, the prime rate criterion fated to disappear is distance. Sweden has already abolished distance from its intercity rates. A call from Malmo to Kiruna (1,400 km) costs the same as a call from Malmo to Helsinborg (80 km).[3] In fact, any modern telecommunications network using dynamic call routing no longer has any technological justification for pricing intercity calls by distance.[4]

In this type of network, calls are routed based on circuit loads. At 10:00 am, when all the Montreal-Toronto circuits are overloaded, and the Montreal-Vancouver and Vancouver-Toronto circuits are idle, Montreal-Toronto calls are routed via Vancouver. Yet the user is charged for a distance (Montreal-Toronto) that has nothing to do with the actual distance covered. However, dynamic call routing applies mainly to voice communications.
In a video environment such as that of cablevision or computer data on the Internet, distance has never been a billing factor. Any attempt to introduce the distance criterion into local service at a time when preparations are underway to eliminate long distance rates would constitute technological heresy.

3.4 - ...and a Cultural Mistake

If we can imagine a universe where users understand the criteria of time or number of calls, it is absolutely impossible to ask users to understand the criterion of distance as it applies to local service. One can visualize a greater distance from Montreal to Vancouver than to Ottawa. But it is harder to determine whether Saint-Sauveur is farther from Montreal than Lanoraie. The shorter the distance, the harder it is to visualize.

Given these circumstances, how can we know whether Papineau Boulevard is closer to or farther from an office on La Gauchetière Street than Décarie Boulevard? And don't forget that each of these major roads covers a broad range of numbers: are we talking about the 2,000 block or the 10,000 block? This criterion is totally unfathomable. We would need a map of Montreal next to the telephone, and this still would not eliminate the potential for mistakes. The introduction of distance into local rate structures would be a cultural mistake by Bell, making it impossible for even the most conscientious consumers to maintain control over their telephone bills.

We must also point out the irony of the company that so proudly announced in the 1970s that "distance is no longer relevant" now increasing the weight of this factor in 1990s rates.

4 - RECOMMENDATIONS

So, what form will rates take in the year 2000? The British magazine *The Economist* asks the question:

When many parts of the network are no longer constrained by capacity, why charge subscribers by the number of seconds they spend on the telephone? Why not simply charge them a regular fee based on the speed and capacity of their line, and something extra for any fancy services they buy?[5]

Two factors lie at the heart of telecommunications: a network and a rate structure. There can be no telecommunications without efficient, dynamic rates. The long-distance market was opened to competition because Mike Keddar took Bell's monolithic rate structure to task and in 1986 devised the Automatic Call Reporting (ACR) service. Today, Mike Keddar's little "garage" company has become Sprint Canada.

Bell is a technological leader. The shortcomings in the local network detailed earlier are not the result of any shortage of expertise. They can easily be remedied. In the area of rates, however, Bell projects a very ambiguous image. The complexity of the rate structure for Envoy 100 electronic messaging in the 1980s was a key factor in discrediting the service. The Internet supplier billing "mistakes" in December 1995 are another dramatic illustration of Bell's sluggishness.

4.1 - Imaginative Rate Structures: Distance

If Bell does not want to be caught short on the information highway as it was in the long distance market, it must approach local rate structures with imagination. No one will accept a complex and unnecessarily punitive rate structure. We need only compare the simplicity of Internet billing with that for Envoy 100 ten years ago. Same type of service, two completely different environments. Today, Envoy 100 (or The Net messaging) is a commercial fiasco, while the Internet has achieved unprecedented success!

Distance will be absent from rate structures for the year 2000. Why should Bell wage a rearguard battle to introduce it into local service? Instead, Bell should champion the new distance-free intercity rate structure. In local service, the key to efficient rate structures is band width. This is where Bell should focus its efforts.

4.2 - Imaginative Rate Structures: Time

Time should not be billed for telephone service. Only content can and should be billed. There is no charge to access 976 numbers, only for 976 services. With the flood of new video and computer and even telephone (voice recognition) services, it will become increasingly pointless and counterproductive to charge for conversations between individuals.[6]

But that's not all. Abundance is linked not only to the increase in band width. It is also the consequence of the proliferation of parallel communications vectors: telecommunications, cable distribution, cellular service, geostationary satellites, and soon mobile telephones, wireless cable and low and medium-orbit satellites. Increasingly, telecommunications companies will be wise to sell packages of integrated services, such as long distance and mobile telephone, with free access to local service as a bonus.

4.3 - Sending a Clear Signal to the Markets

Why doesn't Bell herald the start of the information society by announcing a massive rate revolution that would begin with the elimination of any trace of distance from telephone bills? Bill Gates has made an interesting confession:

> *It's a little scary that as computer technology has moved ahead, there's never been a leader from one era who was also a leader in the next. Microsoft has been a leader in the PC era. So from a historical perspective, I guess Microsoft is disqualified from leading in the highway era of the Information Age.*

Of course, he is very quick to add:

> *But I want to defy this historical tradition.*[7]

Bell's challenge is similar to that faced by Microsoft. After becoming one of the pioneers of the digital era, it still has to prove that it can consolidate its position in the information society. We need an on-ramp to the information highway. Today, Bell's local service plays this role by providing access to the Internet. But as video and CD-quality music spread to "on-line" services, Bell's historic advantage will vanish. This makes it even more urgent for the company to make a clean break with the monolithic past.

But we must not make the wrong break. Pay-per-use local service does not reflect the abundance of the information society, but the shortages of the old industrial world. The information highway will be opened by the champions of marketing, not by accountants. In its own words, Bell plans to "charm its customers and surprise them with innovative products and services that enrich their life and keep them connected to the world."[8] Does pay-per-use local service meet this objective?

APPENDIX 1: REGIONAL SERVICE IN THE UNITED STATES

As in Canada, regional service in the United States has grown with no overall plan, in response to user demands, in a climate of discontent. An aggravating circumstance is the fact that 25 states have set no objective criterion for introducing regional service.[i]

In general, regional service in the United States has moved toward permanent expansion of the area covered. The deployment of digital switching and fibre optics, technologies with little sensitivity to traffic loads and distance, have made this rapid growth in regional service possible.

Today, the move toward expansion of regional service is running into a systematic barrage of objections from long-distance operators, especially AT&T and MCI, which liken it to consolidation of a residual monopoly by the "Baby" Bell companies. With the arrival of competition in local markets, however, this opposition should diminish.

No dominant trend emerges from the diversity of situations. Some local regulators are slowing the trend toward expansion of regional service by freezing the situation on grounds that any boundary is arbitrary and that expansion of regional service simply puts off the problem. Other regulators link the expansion of regional service to political (all communities must be able to call the county seat) or economic (creation of industrial zones) factors.

[i] Study by the National Association of Regulatory Utility Commissioners (NARUC) in 1989. Quoted by Raymond Lawton and John Borrows, "Factors affecting the definition of the local calling area: an assessment of trends", The National Regulatory Research Institute, Columbus, Ohio, 1990, p. 98.

APPENDIX 2: LOCAL MEASURED SERVICE IN THE UNITED STATES

Most American states have some form of local measured service (LMS) in at least some part of their territory (see Table 1). However, this rate system remains unpopular. Maine even held a referendum in 1986 to permanently prohibit LMS. Arizona and Florida had LMS, but abolished it in 1991 and 1995 respectively, the former in a rate ruling, the latter through passage of legislation approving competition in local markets. Texas currently has a moratorium on LMS (optional LMS exists where switching equipment has been digitized).

Table 1

States with no form of LMS
Alaska
Arizona
Florida
Hawaii
Maine

Virtually universal opposition to mandatory LMS

In the majority of states, LMS is optional. Mandatory LMS remains the exception in the residential market (see Table 2) and very rare in the business market (see Table 3). Oregon, Colorado and Georgia have even passed legislation prohibiting mandatory LMS. Texas has approved a moratorium on LMS which prohibits any expansion proposal. In general, opposition to mandatory LMS is acrimonious. A bill banning mandatory LMS in Wisconsin failed to pass, but opposition has not let up.

The main exception to this general rule is Illinois, where mandatory LMS has existed since 1983 and appears to have been well accepted by the population. The case is well documented, even by Bell Canada, which used it as a model in its attempt to introduce LMS in 1984 but has failed to gain acceptance in any other area.

Table 2

States with mandatory LMS (residential and business)
Illinois
New Hampshire
New York City
Vermont
West Virginia*
Wisconsin**

* C&P Telephone; mandatory where equipment is digitized
** Wisconsin Bell and GTE: mandatory. East Coast and Bonduel: optional

Table 3

States with mandatory LMS (business only)
California
District of Columbia
Kansas
Maryland
Massachusetts
Michigan
New Jersey
New York (state)

Low penetration rate for optional LMS

In states where LMS exists, the penetration rate generally remains between 1 and 5 percent, with peaks of about 15 percent in some states (California, Iowa, Kansas, New Hampshire, New Mexico). Subscribers adopt LMS when it gives them savings, failing which they remain attached to fixed rates.

There is one exception, however, Mississippi, where the penetration rate for residential LMS exceeds 50 percent, and the rate for business LMS is 80 percent. This "anomaly" also merits additional information to determine whether the specific form of LMS in Mississippi makes it more acceptable (see sidebar) or whether it is the way it is promoted by the telecommunications company.

New York is a special case. LMS was introduced in 1894 in New York City (not the rest of the state) where it is mandatory for both the residential and business markets. The public

considers it an integral part of normal telephone service. In the rest of the state, LMS is optional for the residential market and mandatory for the business market.

Conclusion

1) Fixed rates are the normal form of rates for local residential service, despite a few notable exceptions (Illinois, New Hampshire, New York City, Vermont, West Virginia and Wisconsin). After losing ground in the 1980s, fixed rates have stabilized or even regained ground (Arizona, Florida).

2) Optional LMS is presented as an alternative to fixed rates in the business market in many of the states that have approved it.

3) There are "anomalies" in which optional LMS is more popular than fixed rates (primarily Mississippi and, to a lesser extent, California, Iowa, Kansas, New Hampshire, New Mexico). Additional research should be carried out to assess the relevance of these cases to the Canadian situation.

4) Mandatory LMS has been almost universally rejected by users (except in Illinois).

Sidebar

THE MISSISSIPPI CASE

LMS in Mississippi includes two plans. The "Economy" plan consists of a basic rate of $10 a month and charges for local calls ranging from 2 to 12 cents a minute depending on the time of day and the distance. Calls are charged by distance zones that have extended regional service as far as 55 miles. Many of these calls were previously long distance. Calls in zones A, B and C (up to 16 miles or to the county seat) are capped at $15 a month. Calls to other distance zones are billed separately.

The "Standard" service plan includes basic service for $16 a month and an allowance of $7.50 for local calls, with a 20 percent discount on calls in zones A, B and C.

The rate plans for business customers are identical: the "Economy" plan consists of a basic rate of $32 a month with a cap of $25; the basic rate for "Standard" service is $38 a month.

Source: Utility Regulatory Policy in the US and Canada,
Compilation 1993-1994, National Association of Regulatory Utility Commissioners, Washington

BIBLIOGRAPHIC NOTES

Halt All Local Tolls (HALT). Responsible Internet Service Companies (RISC).

[1] 1993 Telephone Statistics, Catalogue No. 56-203, Statistics Canada, Ottawa, June 1995.

[2] "We should remember that these rate changes will have no impact on revenue, thus that Bell will lose nothing but also will earn no more than under current rates." Press release, 21 December 1995.

[3] "The End of Monopoly", *The Economist*, 20 September 1995.

[4] We are deliberately avoiding any reference to satellite communications, which totally disregard the concept of distance. No matter where it is routed, every call travels 72,000 km through space.

[5] "The End of Monopoly", *The Economist*, 30 September 1995.

[6] If the time criterion absolutely must be introduced into local rate structures, it should be by large brackets of time, to avoid creating a feeling of rationing telecommunications. But this should be a solution of last resort.

[7] William H. Gates III, *The Road Ahead*, Viking, 1995.

[8] Bell Canada's Vision, Autumn 1995.