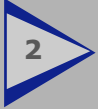




CONNECTEDNESS

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Internet by Cable

D. April



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Abstract

The increasing demand for high-speed Internet access, combined with technological convergence and a pro-competitive regulatory regime, is attracting new entrants in this market. Prominent among them cable companies, which are transforming their extensive wireline networks, making them capable of bi-directional communications.

This paper examines the provision of Internet services over the networks operated by companies in the cable industry and profiles these operators. It contains indicators that describe the extent of the deployment of the necessary cable infrastructure and the degree to which Canadians use these services, analyzes market penetration, industry concentration and growth prospects. The paper also examines planned provision of such services by company size and offers comparisons between Canada and the U.S., indicating that Canada is ahead, both in terms of supply and demand for such services.

In 1999, 61 cable licensees were offering Internet access service and had 364,000 subscribers representing approximately 11% of all household Internet connections. The revenues from the provision of this service were relatively modest at \$113.2 million, averaging \$311 per subscriber. The relatively low revenue per subscriber indicates significant subscriber growth during the year. The largest five enterprises were the first to offer high-speed Internet access by cable and accounted for 92% of all subscribers.

Internet by Cable

By D. April

Daniel April is with the Science, Innovation and Electronic Information Division of Statistics Canada.

The adoption of the Internet by Canadian households continues to grow. There were 3.3 million connected households (28.7% of all households) in November 1999, four times more than in 1996.

The growing interest in this new medium has attracted new suppliers of Internet access services. These services, initially offered by telecommunications carriers and independent Internet Service Providers (ISPs) using the local telephone network as a point of entry, are now also available from cable operators, direct-to-home satellite companies and so-called 'wireless cable' companies¹. The entry of new suppliers was made possible by advances and convergence in technologies, increased network connectivity and a pro-competitive regulatory regime. This changing environment is also affecting the way existing and new audiovisual services are delivered to customers. For instance, the delivery of television signals to the home, which until recently in Canada was the exclusive domain of cable operators, is now available from direct-to-home satellite service providers and wireless cable companies. In addition, the technology exists that would allow delivery of such services through the telephone network.

The market for Internet services and, in particular, the market for high-speed Internet access, is at an early stage of development. Cable companies are important players in this new market and the increasing demand for Internet services has provided them with the opportunity to develop and adapt their extensive broadband network to enable the provision of new services.

This paper examines the provision of Internet services over the networks operated by companies in the cable industry and profiles these operators. An examination of the entire Internet services market would require the inclusion of Internet access services provided by other industries, such as ISPs and telecommunications.

1. The Canadian cable network - an extensive broadband network

The deployment of fibre-coax networks in Canada is well advanced and represents an extensive wireline infrastructure. In 1999, approximately 93% of households had access to the cable network and 73% of households were subscribers (Statistics Canada 2000). This penetration rate is the highest in the world (ITU 1999).

Until recently, however, cable systems were one-way delivery systems for television programming. Several technical challenges must be overcome to make cable networks capable of bi-directional communications, and meeting these challenges requires substantial investments. But the existing infrastructure, on which the provision of Internet by cable relies, was already capable of supporting wide bandwidth², an essential characteristic for the delivery of information at high speeds.

Bandwidth availability is especially important when downloading video or other so-called rich media. These applications run efficiently only when the network can carry large amounts of information from its origin to its destination at high speeds. A

For a cable Internet connection, the customer's personal computer is connected to a special modem, which is in turn connected to a local node by coaxial cable. This node is connected to the cable company's headend through a fibre optic network and the cable company's headend is connected to the Internet backbone.

1 -- These companies utilize Multipoint Distribution Systems (MDS) based on fixed wireless technology capable of carrying television signals, voice (for telephone service) and data (for Internet access).

2 -- There is no widely accepted definition of what constitutes broadband. The United States Federal Communication Commission has defined it as a service providing speeds of at least 200 Kbps/second, both downstream (to the user) and upstream (from the user) - see US (2000). It is difficult to provide one number to describe the performance of the most commonly used broadband systems (cable modem and digital subscriber lines), since the performance of these systems are affected at different degrees by factors such as number of users, distance, and network configuration.

broadband connection can reduce considerably the time necessary to download a video file when compared to a narrowband connection. The development and reach of new multimedia applications for the Internet will necessarily be closely associated with the penetration of high-speed Internet connections, and the cable industry will certainly play an important role in that process.

2. Basic cable facts

Chart 1 provides some basic facts about the Canadian cable industry. These indicators are commonly used to describe the extent of the development of the cable infrastructure and the degree to which Canadians use the services of that industry.

In 1999, there was an estimated 11.6 million households in Canada. Several of them reside in areas outside the reach of existing cable networks and, consequently, do not have access to cable, regardless of whether or not they would want it or could afford it. Thus, 'Households with access to a cable network' refers to the maximum number of households that could have cable service for television viewing, and is an indicator of the extent of the deployment of cable networks. The actual number of households that did subscribe to cable service are referred to as 'Cable subscribers'. Two other observations, provide additional indicators of interest. First, not every cable company offered Internet access services. However, the vast majority of cable subscribers are with companies that did offer such service. This is indicated by 'Cable subscribers of companies providing Internet access' and refers to those subscribers that live within the area served by companies who did offer the new service. Second, the companies that did offer Internet access, did not offer it throughout the geographical territory that they serve. Consequently, not all households living there could have access to it. Those that could are referred to as 'Households with access to cable Internet', while those that actually

subscribed are 'Cable Internet subscribers'.

These basic facts will be used throughout the paper when analysing the deployment of cable modem service and the penetration of this service as of August 31, 1999.

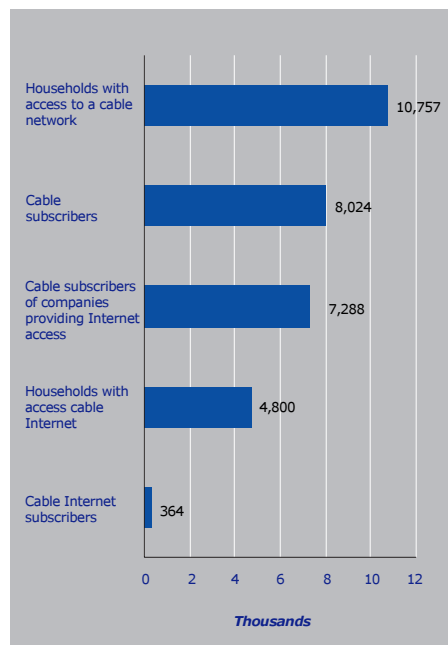


Chart 1.
Basic cable facts, 1999

3. Market penetration

The entry of cable operators into the Internet access service market is relatively recent. Following market trials, high-speed cable Internet services were first launched in a few large markets in November 1996 (CCTA 2000). Less than three years later, 61 cable licensees were offering these services, in both large and small markets. At the end of August 1999, these licensees had 364,000 subscribers to their Internet access services, representing approximately 11% of all household Internet connections³. Table 1 shows the number of subscribers to cable Internet access and their distribution by region. For comparative purposes, the regional distribution of all types of Internet access is also shown.

³ -- It is assumed here that the vast majority of these 364,000 subscribers are households, as opposed to business or institutional clients. The 11% rate is as of August 31, 1999. The Household Internet Use Survey conducted in November 1999 found that the rate had increased to 12%.

NOTE TO READERS

The data shown in this article were collected from a special supplement to the 1999 Annual Return for Broadcasting Distribution Licensees conducted jointly by Statistics Canada and the Canadian Radio-television and Telecommunications Commission (CRTC). Data cover 406 cable licensees for the fiscal year ending August 31, 1999. They were complemented, where necessary, by data from the 1999 Household Internet Use Survey conducted by Statistics Canada and by data published by the Canadian Cable Television Association (CCTA) and the National Cable Television Association (United States).

The paper contains analysis for two types of entities: the *licensee*, which holds one or many licenses to operate one or many cable systems, and; the *enterprise*, which is a corporation that owns one or many cable licensees.

In Statistics Canada's business model, the *enterprise* is the broad organizational unit within which business strategies are formulated and balance sheets are managed. Although enterprises are usually associated with only one *legal entity*, this is not always the case for the large and complex ones. In addition to their legal structure, enterprises also have an *operating structure*, which reflects the way they organize themselves into functional units, hierarchically referred to as statistical *companies, establishments and locations*.

The licensee and the license, as used in this paper, roughly correspond to the legal entity and to the statistical establishment, respectively. Although in most cases the enterprise and the licensee coincide, the larger enterprises in the industry generally own more than one licensee. Thus, the licensee is a more appropriate entity when analyzing market size and growth, while the enterprise is a more appropriate unit when analyzing industry concentration. In this paper, *licensee* and *company* are used synonymously.

Table 1.
*Internet access by region, 1999**

	Cable Internet Subscribers		Internet Penetration at Home - All Types
	(,000)	Distribution (%)	Distribution (%)
Atlantic Provinces	11	3.1	6.3
Québec	55	15.2	18.9
Ontario	142	38.9	41.1
Prairie Provinces	85	23.3	17.0
British Columbia and Territories	71	19.5	16.7
Canada	364	100.0	100.0

* The level of geographical detail shown here is the most detailed possible to protect the confidentiality of individual company responses. Internet access from home, by all types, is available by province from the Household Internet Use Survey (Dickinson and Ellison 2000).

High-speed Internet access by cable is most popular in Western Canada. The region accounted for 42.8% of cable Internet subscribers, compared to 33.7% of all home Internet subscribers. This is probably explained, at least in part, by the fact that households in Western Canada, and particularly in Alberta and British Columbia, adopted the Internet technology in relatively greater numbers earlier rather than later. Early adopters and regular users of the Internet are more likely to be interested in a premium service, such as that offered by cable companies. The situation is reversed in the Central and Atlantic provinces where the proportion of cable Internet subscribers falls short of that of total home Internet access.

Table 2 shows that the popularity of cable Internet access in Western provinces is also reflected in the higher than average penetration rates achieved by cable companies operating there. By contrast, cable companies in Quebec and the Atlantic provinces had lower penetration rates than the 5% national average.

4. Revenues

Revenues from the provision of high-speed Internet access by cable, in 1999, were relatively modest at \$113.2 million (\$311 per subscriber), when compared to the industry's total revenues of \$3.3 billion. Of these \$113.2 million, \$59.4 million were generated directly by cable licensees

and \$53.7 million were generated by their affiliates⁴. The relatively low revenue per subscriber indicates significant subscriber growth during the year.

Although relatively small at this time, this market is likely to grow rapidly. Assuming a conservative 2% per month increase⁵ in the number of subscribers from August 1999 to August 2001, revenues for this activity would more than double, reaching approximately \$250 million in 2001. If the industry's forecast of 1.5 million subscribers by 2007 (CCTA 2000a) is realized, the market would reach \$650-750 million dollars a year. To put this into perspective, this value would be comparable to the current size of the FM radio advertising market or to the subscription revenues received by pay and specialty television undertakings.

5. Industry concentration

The cable industry includes a relatively large number of participants (340 enterprises with 406 licensees), but it is highly concentrated. As shown in Table 3, the industry's top five enterprises, which owned and operated 23 cable licensees, served 80% of Canadian cable subscribers.

Over the last few years, the major cable operators have made acquisitions and exchanged systems in order to develop contiguous service areas, a condition that facilitates the deployment of cable modem service.

4 -- Average monthly growth in the number of household Internet connections from November 1998 to November 1999. This is a conservative estimate since there is likely to be a substitution from dial-up service to high-speed service in future years, whether cable or other types. The CCTA (2000a) estimates that the number of subscribers reached 479,000 at the end of 1999, which implies a 30% increase in the last four months of 1999.

5 -- Some cable companies offer Internet access services directly to their clients and show the revenues generated by these services on their books. Others have created subsidiaries to provide these services. Depending on the legal structure adopted, these subsidiaries may be classified to the Internet service providers industry rather than the cable industry.

Table 2.
Penetration of cable Internet, 1999

	Cable Internet Subscribers	Cable Subscribers Companies Providing Internet Access	Penetration rate*
	(,000)	(,000)	(%)
Atlantic Provinces	11	465	2.4
Québec	55	1,859	3.0
Ontario	142	2,807	5.1
Prairie Provinces	85	1,034	8.2
British Columbia and Territories	71	1,124	6.3
Canada	364	7,288	5.0

* The proportion of cable subscribers that also subscribed to cable Internet.

Table 3.
Concentration in the cable and cable Internet markets, 1999

	Internet Subscribers	Percentage of Total	Cable Subscribers	Percentage of Total
	(,000)		(,000)	
Top 5 firms	337	92.4	6,411	79.9
Top 20 firms	353	97.0	7,509	93.6
All enterprises	364	100.0	8,024	100.0

These enterprises were the first to offer high-speed Internet access by cable and accounted for 92% of subscribers to this service.

6. Canada - U.S. comparison

It is revealing to compare the Canadian situation to the situation in the United States, where concentration in terms of service areas and subscribers by company are not as high. Available statistics suggest that the deployment of cable modem service is significantly ahead in Canada, both in terms of supply and demand for the service.

As can be seen in Table 4, in 1999 there were 4.8 million households in Canada that could access the Internet by cable, representing 45% of households with access to a cable network, significantly more than the 30% achieved in the United States. While Canada accounted for 10% of households with access to a cable network in both countries, it accounted for more than 14% of households with access to Internet by cable. On the demand side, 7.6% of

households with access to cable Internet subscribed to these services, compared to 5.5% in the United States.

It is clear from the information above that the deployment of this particular broadband technology is proceeding at a fast pace. Some will argue, however, that there is still much progress to be made before achieving universal access to these services, and in particular in providing access outside urban areas. The next sections take a closer look at the profile of providers and non-providers of cable modem services, and at future plans of the non-providers, in an attempt to shed some light on the issue of universal access.

7. Providers and non-providers of cable Internet - A profile

Canadian cable operators had more than 8 million subscribers in 1999 and their networks could be accessed by 10.8 million households. The potential market for high-speed Internet access by cable therefore remains largely untouched. As shown in Table 5,

6 -- Internet access service was not available to all subscribers at that point in time. This figure represents the total potential market for cable companies already providing access to the service to some of their customers.

Table 4.
Comparison of the Canadian and U.S. cable and cable Internet markets, 1999

	Cable Internet Subscribers	Households with access to Cable Internet	Cable Subscribers	Households with Access to Cable
		(,000)		
Canada	364	4,800	8,024	10,757
United States	1,600	29,000	68,538	96,000

Canadian Statistics: Statistics Canada and the Canadian Cable Television Association (CCTA 2000b).
United States Statistics: The National Cable Television Association (NCTA 2000).

licensees already offering Internet services to some customers had 7.3 million cable subscribers⁶, or 91% of all cable subscribers. It is probably safe to assume that a majority of the households with access to these systems will eventually have access to cable modem service, as their cable service supplier proceeds with network upgrades.

Table 5 shows that the provision of cable modem service is largely the domain of licensees with more than 100,000 subscribers. While all cable licensees in that category offered Internet services, only 51 of the remaining 396 licensees (13%) did. Almost 9 of every 10 subscribers to cable Internet were clients of licensees with more than 100,000 subscribers.

For the most part, licensees with more than 100,000 subscribers operate systems in large and medium-sized cities. By contrast, the majority of other licensees have less than 3,000 subscribers (308 of 396 licensees) and operate in small towns

and villages. It is probably difficult for most small-sized operators to justify and make the investments necessary to launch high-speed Internet access services, especially since they are more vulnerable to competition from satellite providers. Despite this, a number of these licensees plan to offer Internet services by the end of 2001. The next section examines the short term plans of companies that did not offer Internet services in 1999.

8. Short-term plans

The majority (345 of 406) of cable licensees did not offer Internet access in 1999. As shown in Table 6, most non-providers are licensees with less than 10,000 subscribers and together they account for less than 10% of cable subscribers. More than half of these small licensees operate in the provinces of Québec and British Columbia, but it is in the Territories, Newfoundland and Nova Scotia that small operators have the largest market share.

Table 5.

Licensees providing cable Internet access, by size, 1999

	All Licensees	Licensees Providing Internet Access	Cable Internet Subscribers (,000)	Cable Subscribers of Companies Providing Internet Access (,000)
Licensees with:				
100,000 cable subscribers or more	10	10	322	6,308
Less than 100,000 cable subscribers	396	51	42	980
Total	406	61	364	7,288

Table 6.

Planned provision of cable Internet access, by licensee size, 1999

	All Licensees	Cable Internet Subscribers (,000)	Cable Subscribers (,000)
Licensees:			
Offering Internet services to some or all of their clients	61	364	7,288
Planning to offer Internet services by 2001	67	-	435
Between 10,000 and 100,000 subscribers	13		287
Less than 100,000 subscribers	54		149
Not offering nor planning to offer Internet services	278	-	301
Between 10,000 and 100,000 subscribers	5		122
Less than 100,000 subscribers	273		179
Total	406	364	8,024

Close to 20% (67 of 345) of licensees that did not offer Internet services in 1999 indicated that they plan to do so by 2001 - among them, a significant number of very small operators (less than 10,000 subscribers). If these plans are realized, an additional 435,000 cable subscribers could have access to high-speed Internet by cable, bringing the total number of cable subscribers in that position to 7.7 million or 96% of cable subscribers⁷.

It is unlikely that too many of the 278 licensees neither offering nor planning to offer Internet services by 2001 will deploy these services in the future. More than 80% of them have less than 1,000 subscribers, and very few companies of that size have entered the Internet services market.

Conclusion

The cable industry has gone through considerable change over the last decade. The introduction of several new specialty and pay channels and the entry of the industry into the Internet access service market could only be achieved by making significant improvements to existing networks. The recent network upgrades, as well as those planned for the near future, will lead to the delivery of new entertainment and information services that will be available through the personal

computer or the television set. The recent deployment of digital decoders by some cable companies is a prelude to these events.

The industry, which was able to provide cable modem service to approximately 4.8 million homes in 1999, is still a few years away from being able to offer high-speed Internet access to most of its customers. This will largely depend on customer demand and on the industry's ability to make the necessary investments to provide the service. Although at an early stage of development, customer response to this service already exceeds some private sector projections (CCTA 2000a). The data reported in this paper confirm the industry's effort to seize the opportunity of a rapidly expanding market.

The fundamental changes affecting the cable industry are happening at a time when there is more competition in existing audiovisual and information service markets than ever before, and this competition will more than likely extend to new markets. Since 1998, wireless program distribution undertakings have been competing in the program delivery market, and are now competing in the Internet access services market. Telecommunications operators, directly or through subsidiaries, are also active in these markets. The race is on!

7 -- This is an optimistic scenario, under which cable operators offering cable modem service make it available to all their customers.

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