

as improving the quality and delivery of our social, educational and health care services, creating new jobs in information-related fields, and increasing the productivity of industries that face intense international competition.

14.1 Telecommunications system

The Canadian telecommunications system is composed of private and public elements operating under federal and provincial jurisdictions. It includes nine major and many smaller telephone companies, a telegraph-based company that competes with the telephone companies in everything but public telephone services, a domestic satellite carrier, an overseas carrier and hundreds of cable television companies. In addition, teletext and datacasting services sending information on television signals are likely to be implemented in the near future.

On a per-capita basis, Canada has the most extensive telecommunications system in the world. It stretches to virtually every community of the world's second largest country. In 1985, over 98% of Canadian homes had telephones, and more than half of these had two or more telephones. In 1985, the assets of the Canadian telephone industry totalled more than \$22 billion and its operating revenues were approximately \$10 billion.

Communications in Canada contributed 4.2% (\$5.5 billion) of the country's Gross National Product (GNP) in 1985.

14.1.1 Carriers

Canada's telecommunications carriers own and operate the networks, equipment and services of the national system. While some carriers are private companies, a significant number are publicly owned. All are required, by law, to carry user calls, messages and other information at a reasonable cost without changing the content.

Although the majority of carriers are telephone companies, they also provide other services, including data transmission. Investment in plants, equipment and buildings owned and operated by the carriers is ongoing; a significant proportion of it is used to implement new computer and communications technologies and to modernize infrastructures.

Telecom Canada is a consortium of large carriers, linking the regional networks of 10 telecommunications companies across Canada. Six are privately owned telephone companies and three are provincially owned, by the governments of Alberta, Saskatchewan and Manitoba. The tenth member of the consortium, Telesat

Canada, owns and operates Canada's satellite communications system.

CNCP Telecommunications, another major carrier, provides services other than public telephone service across Canada in competition with Telecom Canada. Teleglobe Canada is the country's international carrier, connecting domestic and overseas networks.

14.1.2 Telecommunications networks

New technologies are gradually transforming Canada's telecommunications infrastructure. Canada has been a leader in replacing analogue communications, in which signals travel in continuous waves, with digital communications, in which signals are transmitted in discrete pulses. Because the digital mode uses computer language in its signals, it is able to carry more information than the analogue mode. It is also less susceptible to interference. Using digital and computer technologies in telecommunications has opened the way for vast interconnectable networks and myriad new applications.

In many of Canada's carrier networks, especially where traffic is heaviest, new fibre-optic cables are replacing traditional copper cables. The new cables are able to carry more information, faster, with less signal loss, than the copper cables. They are also better adapted to certain applications, such as underwater lines, because of their high capacity at low cable diameters. Both Telecom Canada and CNCP Telecommunications are in the process of laying fibre-optic trunk-lines which will be the backbone of two competing transcontinental networks in the 1990s, supplementary to their existing microwave radio networks.

Terrestrial systems. Three nation-spanning microwave networks form the backbone of Canada's telecommunications networks. Two of them are owned by Telecom Canada, and the third by CNCP Telecommunications. These networks consist of microwave stations spaced about 50 km apart, which relay radio signals, and amplify them along the way to compensate for normal signal loss. In general, a microwave channel can carry more than 1,200 telegraph, data or telephone signals or one television signal. The amount of traffic in a given area determines the number of channels used.

14.1.3 Domestic communications satellite system

Canada's satellites serve as enormous microwave towers locked into geostationary orbit about 35,900 km above the equator. Signals beamed up to them can be relayed