

**Environmental Assessment of the
Communications Sector
1985 Update**

DRAFT REPORT

December 1985

**Prepared by: John Mazure
Danielle Solimka
Technology and
Policy Assessment
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1.0 EXECUTIVE SUMMARY

1.1 Economic Outlook

World economies have entered a post-recession period in 1983; and while U.S. growth prospects influence short-term prospects for other countries, real growth is beginning. The average rate of increase in consumer prices fell. Continued moderation in inflation rates and interest rates is forecast. Unemployment remains a serious problem for most industrialized countries. Notwithstanding, all countries are expected to continue their respective rates of expansion.

The recovery in Canada was stronger than average previous experience with real GNP increasing. Consumer expenditures showed their largest increase since 1976 and short-term interest rates declined from peak levels, but remained at the 11% level by the end of 1984. Price increases declined from double digit levels. Employment grew outpacing an increase in the labor force. Most of this growth has come of late resulting in only a moderate decline in the unemployment rate. The phenomena of labor force growth exceeding employment growth leading to only a moderate drop in unemployment rates was common throughout the country.

The general outlook for the Canadian economy will continue to reflect American performance. Short-term forecasts call for sustained but moderate real growth with some decline in unemployment and interest rates, and stable inflation.

The medium term outlook to 1990 depends on assumptions made about the importance and possible evaluation of international interest rates. Alternative scenarios on the favorability of the international environment have led to Canadian medium-term projections.

The provincial outlooks are a veritable seesaw of expansions and contractions in their respective economies.

Economic recovery in British Columbia proceeded at a slower pace than the rest of the nation over the 1983-1984 period. Real GDP in the province increased by a modest 1.6% in 1983 and 2.1% in 1984. The unemployment problem continued increasing its rate to just under 15%. A bright spot in the provincial economy was the inflation rate which continued to decline and remains below the national average. B.C. is expected to exhibit stronger growth over the short-term. Expo'86 should stimulate economic activity especially in transportation, communications, accommodation, and food services. As a result forecasts call for real GDP in 1986 to exceed previous levels by 2.5%.

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Unlike the rest of the country Alberta continued to dwell in recession in 1983-1984. High unemployment rates, a fall in investment income, and lack of a farm income growth contributed to a sharp decline in real disposable income. This affected the residential construction, retail trade, and food and beverage manufacturing sectors. All of this led to a 4% decline in real GDP for 1983. Signs of recovery began to surface in 1984 as upswings in mineral fuel production, exploration, and development paced the mining sector. The outlook for the manufacturing sector is mixed with industries linked to the oil and gas resources sector, to experience higher growth rates. Employment growth in these industries is expected to drop the unemployment rate. A significant project development in Cold Lake and plant expansions planned by Syncrude Canada and Suncor Inc. are expected to have positive impacts on the economy.

Growth of the Saskatchewan economy was hampered by droughts in both 1983 and 1984 with crop production dropping. This saw personal disposable income growth decline over the two-year period, as well as curb consumer expenditures. The service sector sustained the overall economy for 1983-1984. Unemployment rates rose but continued to remain among the lowest in the country. Strong growth within the manufacturing sector and the construction industry together with an expansion of agricultural output is predicted for 1985 a more moderate increase in output is projected beyond to 1986.

The importance of the trade and distribution sectors to the Manitoba economy were particularly evident in 1983 and in 1984. Moderate but consistent increases in the services industries can be attributed to inflation and unemployment rates remaining below national averages and to the growth in personal disposable income. Inflation fell while unemployment remained static. The economy as a whole showed an improvement in real growth. Forecasts call for real GDP growth rates of 3% in 1985 and 2.1% in 1986.

Compared to the rest of the country Ontario showed above average increases in real GDP. Unlike most other provinces all sectors showed positive growth rates in both years with the exception of construction in 1984. The goods producing industries also outpaced the services producing industries. However, increased growth rates were largely because of an increase in demand by consumers for durable goods created by a fall in nominal interest rates and stable increases in personal disposable income. Unemployment rates remained around the 9-10% level despite employment growth. Despite decelerating growth over the period, inflation remained above the national average. The outlook for 1985 calls for a moderate increase in real GDP. The Ontario economy is predicted to slow down further in 1986.

In 1983 Quebec began a strong recovery. This continued in 1984 when the economy experience its highest growth rate since 1974. Growth was led by the manufacturing, wholesale and retail trade sectors. Unemployment continued to be a major problem. The Quebec economy is expected to show a slower pace of growth in 1985. Weaknesses in primary industries and construction activity form the basis of the forecast. As the economy enters 1986, the services sector will begin to experience a reduction in growth.

The New Brunswick economy underwent a transition in 1983. While services industries continued to show moderate increases, notable increases in goods-based industries boosted the overall GDP growth rate. In 1984, the province experienced its greatest growth since 1974. Much of the growth was due to increases in resource-based production and improved export performance. Despite the banner years enjoyed by some sectors, unemployment remained around the 15% level. The rate of inflation, while declining, still remained above the national average. Growth prospects for 1985 are seen to come from the service sector but decelerating growth in 1986 is also seen together with a decline in demand for consumer services.

The Nova Scotia economy grew faster than any other province in 1983 and 1984. The key to this performance was offshore oil exploration and gains made in specific goods-producing and services-producing industries. Unemployment rates remained disappointingly high in spite of the remarkable performance enjoyed by the economy. Though the rate of price increases fell absolutely, they rose relative to the national average. Weak consumer expenditure growth, limited gains in export opportunities, and moderate business investment spending form the basis of the 1985-1986 outlook.

With an exceptional year realized by potato farmers and lobster fisherman and moderate increases in service sector output, the Island enjoyed better than average growth production in 1983. However, little improvement was made with respect to unemployment and rates remained marginally higher than the national average. Consumer spending responded to increases in personal disposable income and played a major role in Prince Edward Island's economy for the latter part of 1983 and 1984. The trend for the P.E.I. economy in 1985 and 1986 points to a decline in growth rates.

The Newfoundland economy was hit harder than most other provinces by the 1981-1982 recession and, despite increases in real growth, has yet to fully recover. The province's relatively higher dependence on non-U.S. markets for its export-oriented resource industries impeded production as U.S. demand was considerably stronger than that of most other countries. Compounding the problem were declines in manufacturing and construction. Not surprisingly, unemployment rates reached crises proportions. The situation is not expected to improve in the short-term.

Technology Profile

Six technologies have been deemed to have important implications for the development of the future communications policy process. These are: coaxial cable, fibre optics, radio microwave, satellite communication, cellular mobile radio, and local area networks. All are in varying stages of development, innovation and application.

Coaxial cable has evolved from a simple means of providing television viewers with distant broadcasting signals to a sophisticated electronic delivery system offering an over-expanding array of services, including home entertainment, news, and interactive financial transactions. Fibre optics is a technology developed for the transmission of information through optical fibres. The technical development of fibre optics can be divided into first, second and third generation. Radio microwave is a mature technology but recent component developments could lead to more advanced communications services in the home and office. While long distance telephone trunking will remain the major application, technological developments are facilitating its use in small-scale dedicated networks. Some technological advances in satellite communications include the transition to digital transmission for a variety of signals and improved modulation techniques. Cellular Mobile Radio is currently creating a revolution in the provision of mobile radio telephony. While most users of land mobile radio continue to use private rather than public cellular systems, over the next few years, this balance is expected to shift. The evolution of mobile technologies is bringing significant advances in the area of cost reductions and improved quality service. Local area network can be defined as "a communications network that provides for the interconnection of a variety of data communicating devices with a small area." It evolves around three main elements: transmission medium, network typology, and access method. The transmission medium element is by far the most important of these in terms of policy development.

The subsectors of this report: telecommunication, broadcasting and cable, and informatics, are seeing latest developments in these technologies applied to their particular needs. Within the telecommunications/carriage subsector, voice telephony is being facilitated by coaxial cable, fibre optics, satellites, and cellular mobile radio technologies which are making inroads into traditional networks. Similarly, data transmission which is here inclusive of messages, teletext, and facsimile is given wider scope by the application of these technologies in areas such as two-way interactive data transmission, wideband data transmission, mobile data transmission, acquisition and control services.

In the broadcasting and cable subsector there has been an explosion in the use of new technologies to deliver programs. This has been dominated by an expansion in the capacity of cable television and by the emergence of satellites, satellite net-

works, DBS home receivers, pay television, and videotex. The informatics subsector, which is seeing a convergence of what was once two distinct components computers and telecommunications, is gaining by the rapid developments of technologies in both subsectors in the creation of integrated voice, data, and image networks, in the provision of enhanced services, and in the integrated transmission medium afforded by LANS.

1.3

Industry Profile

Communications industries conducting business in Canada comprise firms in Telecommunications, Broadcasting and Cable, Culture, Informatics, Space and a Manufacturing group of companies for all sectors. Combined earnings in 1983-1984 for these industries were approximately \$52 billion. There were a total of about 3,000 firms employing well over a half million people.

The Telecommunications sector included 124 firms which together earned just over \$10.1 billion and employed over 113 thousand people.

The Broadcasting and Cable sector, which comprises three subsectors, consisted of 633 firms grossing \$2 billion plus and employing 35.8 thousand people. Radio and Television, one subsector of Broadcasting and Cable, had 286 firms, \$1.3 billion plus in revenues, and employed 16.5 thousand people. CATV had 346 firms earning \$531.9 million and employing 6.7 thousand. The CBC, the third subsector, had revenues of \$149.2 million and employed 12,473.

The Cultural Industries as a group of 563 "firms" had earnings of over \$9 billion and over 107.6 thousand employees. The Cultural industries comprise eight subsectors: the Performing Arts of which 141 firms had revenues of \$221.9 million and employed 28,515; the Visual Arts of which 59 firms had revenues of \$101.8 million and employed 1,645; Film and Video where 43 companies earned \$921.1 million and employed 13.5 thousand; Book Publishing where 105 firms had revenues of \$1.17 billion plus and 17.3 thousand employed; Newspaper Publishing of which 107 firms earned above \$5 billion and employing 67.4 thousand; Periodical Publishing finding 32 firms earning \$238.1 million and employed just over 5 thousand; Sound Recording firms numbering 76, employing 2.5 thousand people and earnings of \$353.6 million; included as the eighth subsector for the Cultural industries are Government Grants and Contributions which totalled close to \$380 million.

The Informatics sector consists of 396 firms with an earning capacity of \$18.9 billion and employing 21,629 people.

The Space sector with a 3 thousand plus labor force had 40 companies earning \$262.5 million.

The Manufacturing sector which contains most of the Space sector and components of the Informatics, Broadcasting and Cable, and Telecommunications sector comprised 1,038 firms, 75,731 employees, and revenues of over \$11.5 billion.

A pattern in both revenue earnings by firms and in the location of these firms in certain provinces is very evident. A very small number of very large firms, in all sectors, were concentrated in the province of Ontario and these firms generated, on average, 55.42 percent of total earnings within Communications Industry sectors. Quebec was not even a close second with 14.10 percent, British Columbia an even farther third with 10.35 percent, Alberta fourth with 8.28 percent, and the remaining provinces representing a decreasing average in revenue earnings overall.

1.4 Market Profile

1.4.1 Telecommunications

The industry consists of a mixture of private, government and joint private and governmental corporations and organizations. Domestic local and long distance public switched voice services are provided on a monopoly basis by telephone companies operating in their respective regions and provinces. Public message service is provided on a monopoly basis by CNCP. The current structure of the telecommunications carriage industry is largely the result of public policy based on historical premises that no longer hold true with demands for increased competition being driven by technological change.

The behavior of firms in many of the telecommunications carriage and service provider markets is constrained by a complex regulatory structure. A regulatory environment finds most telephone companies following similar pricing principles and comparable rate structures. Though cable companies primarily distribute television and radio programs, they are diversifying into areas traditionally served by telephone companies. A recent CRTC ruling on enhanced services calls for the provision of these services on a competitive basis. Common carriers, as a consequence, can be expected to restructure service offerings and rates to distinguish between basic and enhanced services. Competition is increasing not only between firms serving the same market, but more noticeably, a trend towards diversification is seeing com-

petition evolve between firms traditionally operating in different markets.

Given the dynamic trend in the industry, regulators are hard pressed to maintain the current regulatory structure. New technologies have led also to an expansion in the telecommunications sector as a whole. Driven by technological change, the existing structure of telecommunications carriage and services markets is being challenged. Technological innovation has also precipitated different types of competition that threaten the monopoly position of current carriers and their current pricing policies. A series of new telecom services and suppliers are emerging which have no restrictions or conditions placed on their market or economic behavior. In the advent, carriers are demanding rate rebalancing so that prices reflect costs. But more importantly, they are demanding that their ability to compete not be hindered. Given that regulation will have impact on the structure of the telecom sector and the behavior and performance of the firms within it, possible future market segments have been suggested.

At the international level, a trend toward improving industry competitiveness through deregulation, led by the U.S., has put the Canadian telecommunications services industries in a precarious position. Despite concerns that the current structure of the industry is constraining domestic firms' ability to compete internationally, opportunities for Canadian carriers still exist.

The structure of the Canadian telecommunications equipment industry has been dominated by two firms. Both have associated research firms and each is integrated with one of the two largest carriers. These two equipment suppliers are the only Canadian manufacturers offering a broad range of equipment; the others tend to offer more specialized product lines and components. Success in the telecom equipment industry is best illustrated by Northern Telecom. To a large extent, success by the other industry players has been dependent on identifying and exploiting a market niche resulting from a gap in the product lines of large companies. To the extent that recent changes for carriers and service providers lead to the establishment of new telecommunications networks, the expansion of existing networks, or to increased purchases by end users, there will be growth in demand for telecom equipment.

Over the short to medium term, it is expected that the sales of telephone exchange switches and PBXs will continue to dominate the Canadian telecommunications equipment market. An introduction of competition in the carriage industry will have important implications for equipment manufacturers and sup-

pliers. Essential factors for success will be the ability of firms to develop and market innovative products on an ongoing basis, and to broaden their product lines in order to be more responsive to shifts in market demands. Despite a growing internationalization in the domestic market, Canadian manufacturers have seen their share decline in world markets. The future of the Canadian telecommunications equipment industry, therefore, will depend on building on the strengths which currently exist; for small firms and new entrants that they confine themselves to offering narrow product lines or serving specialized vertical markets.

1.4.2 Broadcasting and Cable

This industry is also comprised of a mixture of public and private enterprises. The radio industry shows that the major revenue earners are located in large markets and that large business organizations tend to own groups of broadcasting stations located within those markets. For smaller organizations, markets are dependent on local advertizing revenues. In comparison to radio broadcasting, television broadcasting in Canada is highly profitable. New challenges and new technologies are being introduced in the industry that will greatly increase the reach and number of broadcast signals transmitted within Canada as well as across our borders. There is, however, a real possibility that these innovations could undermine the present broadcasting system. To seize the opportunities presented by new technologies, the implementation of the new broadcasting strategy will be welcomed. The international environment figures prominently in the federal government's Broadcasting Strategy for Canada. Foreign competition to Canadian radio and television broadcasting is very real, especially competition from the U.S. Foreign programs, predominantly from the U.S., account for 85 percent of viewing on English-language television during peak evening hours. They represent 77 percent of total viewing throughout the day. French-language television is in a healthier state.

The Canadian cable television service providers are made up of small individually-owned businesses. Revenue and profit curves are skewed dramatically to the large companies where economies of scale and density can be realized. By far the largest share of industry revenues are generated by direct subscriptions for basic, discretionary and specialty services. Indirect subscriptions and service installations accounted for about 10 percent of revenues. Basic subscriptions have, as of 1982, ceased to be the prime growth generator in the market. The growth area seems to be in discretionary services which is seeing the CATV industry invest several million dollars on marketing campaigns, equipment, personnel and retail outlets necessary for the promo-

tion and distribution of this service. Government regulation not only influences the structure of the cable television industry, but plays a prominent role in the industry's conduct in the marketplace. The CRTC, through conditions to the license and general regulations and policies, regulates operating practices, basic subscription rates and cable services. Additionally, the Federal Department of Communications establishes specific technical standards for the quality of the signals delivered into the subscriber's home via cable. Project 90, a study conducted on behalf of the CCTA, looks at the CATV industry over the next 5 year period. They see the main factors impacting upon the industry between now and 1990 to be: increased competition and service demand, new technology, and a new approach to regulation. Canada's place in the international cable television market is small.

It is the intention of the government to conduct a fundamental review of the role of the CBC to ensure that it provides programming appropriate to the new broadcasting environment.

Many of the products in the broad categories between the cable television and broadcast subsectors overlap into the telecommunications and electronics industries. Key market segments are significant determinants of the structure of the CATV market, and this can probably be assumed to hold true for radio and television broadcasting suppliers as well. Domestic and foreign equipment manufacturers are usually linked to the medium and small-sized broadcasters and cable service providers through distributors. There is very little vertical integration between equipment manufacturers and operators, although there are a few exceptions in the CATV industry. The broadcasting and cable manufacturing industry in Canada is tied to events in the service providers subsector.

The projected growth in new television services and the extension of services to remote areas should lead to a growing demand by radio, television and cable broadcasters and operators for new equipment. Canadian suppliers have potentially strong domestic market for the remainder of the decade. The Canadian market for basic cable and broadcasting services is relatively mature, offering only modest potential for growth in that area. There is, however, significant potential for growth in basic cable services in the U.S. and some European countries.

1.4.3 Cultural Industries

Performing Arts

The performing arts industry is comprised of companies and individuals involved in the production of "live" performances

of drama, dance, music and opera. Of all performing arts companies, 35 percent were located in Ontario and 30 percent in Quebec. The total number of companies in Canada grew, between 1971 and 1981, by 525 percent. This growth has been paralleled by a similar growth in the performing arts labor force which can only be explained in part by a corresponding increase in demand where attendance grew by 247 percent over the 1971-1981 period. Sources of revenue for the performing arts companies were: 50 percent, earned revenues; 37 percent, government subsidies; and 13 percent, private grants. In this respect, government funding is an important source of revenue. Emphasis has shifted away from municipal funding to federal and provincial funding with provincial support gaining in relative importance. However, that the government has a fixed budget, large scale investment must be limited to a few "national" companies. Firms in the performing arts face barriers to entry, barriers to scale, and barriers to exit as a result of government and agency financial involvement. Constant productivity suggests that the performing arts will be subject to the problems of costs which are continually rising relative to output, as wages and productivity rise in other sectors.

Technical progress in the performing arts has not remained entirely static. However, the performing arts must compete with an expanding leisure industry, where technical progress and development have adapted more easily to changing market conditions. Firms in the performing arts can be viewed as operating in three separate markets, as defined by their sources of revenue, and while they may not actively engage in competition, implicitly, they must compete for finite sources of revenue. Price discrimination is practised successfully by most performing arts firms in the form of market segmentation by demographics and by time. There is a growing tendency for performing arts firms to behave more like the profit seeking firms of the private sector, that is, developing financial efficiency and advanced marketing skills. In the world market, government funding is made available to national companies or companies with reputations for excellence to tour or attend festivals.

Visual Arts

Visual arts works such as printing, sculptures, photographs, artifacts of historical or scientific importance are found in three markets: the non-profit public sector for example, (museums); the non-profit private sector (artist-run centers); and the for-profit private sector (galleries). Public galleries and museums acquire, store and present works of art and other objects of historical or technical value to the general public. The exclusive nature of the visual arts exhibited in public galleries and museums automatically implies monopoly power because each gallery or museum possesses a unique collection. The overall distri-

bution of galleries and museums is closely correlated to the population distribution but this concentration is lessened by the ability to organize touring exhibitions. The growth of museums and public galleries is represented by the increased output or availability of visual arts, rather than demand-generated growth. The creative segment of the visual arts labor force shows a trend of growth similar to that of the performing arts labor force.

The market for visual arts treasures dictates that only a few wealthy buyers can afford such works, however, the government as a buyer in this market is able to acquire art treasures on behalf of the general public.

Private sector distribution consists of the routes, methods and processes by which visual arts products are moved from creator to consumer. Five or six art auction houses sell artwork across Canada and act as a key price guide for art investors. Private art galleries are small, owner-operated, have few employees and do not use large physical facilities. They are concentrated in certain provinces, and in major cities are either clustered in the core-area or isolated from each other in suburban malls. New entry is possible in the market as indicated by the young age of some art galleries. In terms of content, it has been estimated that Canadians purchase $5\frac{1}{2}$ more times domestically-produced art than foreign art when they purchase from retail galleries. The heterogeneous nature of the conduct of retail art galleries implies that government programs and policies affecting the art market have different impact upon each. Pricing policies are influenced by a number of factors and generally reflect the costs of production but is usually based on the reputation and previous success of the producing artist. Artist-run centers developed from the apparent need of artists to sidestep dealers and gallery owners. They receive financial assistance from all three levels of government.

Sound Recording

The sound recording industry is defined by firms engaged in the production and leasing of master tapes, and the release and sale of sound recordings mainly through the production of phonograph records and prerecorded audio tapes. More recently, the production of compact laser disc and music videos have become important products of the industry. The industry is highly concentrated and dominated by foreign-controlled companies. Statistics Canada reports gross 1983 earnings of \$324 million by 94 companies. The production of several forms of sound recording characterizes horizontal integration for the major companies while their involvement in production, publication and dis-

tribution of the goods indicates that they are also vertically integrated.

The market for sound recordings has grown substantially in Canada over the last 15 years. Canadians are presently regarded as the highest per capita consumers of sound recordings in the world. Government involvement in the sound recording industry is directed through the CBC and is principally concerned with Canadian content. The government also regulates the content of other broadcasting media in Canada through the CRTC ensuring that Canadian works receive some minimum of attention. Although recording studios are generally domestically-controlled, almost 50 percent of the pressing/duplicating plants are American-controlled. A number of factors account for the slow development of a Canadian recording industry. Since the industry imports the majority of its production equipment from Europe, Japan, and the U.S., virtually all research and development has taken place abroad and this has important implications for the future development of the sound recording industry in Canada. The most important trend emerging in the sound recording industry stems from technical innovations. On the world market, Canada must compete with the U.S. which represents over half of the world market for records and tapes. Also, there are a number of tariffs of concern to the industry.

Film and Video

The film and video market is defined as the production, distribution and exhibition of theatrical feature films and shorts, films and mini-series made for television, documentaries, educational and industrial films, and television commercials. The industry has both public and private elements. The film and video production industry in Canada is characterized by a large number of small companies (479 in 1982) of which 31 percent account for approximately 66 percent of total revenues. The film and video sector is more labor intensive than almost any other industry in Canada. The production of film and video in Canada is financed from a number of sources. The number of organizations involved in providing production services to the industry had increased revenues of 192 percent resulting, to some extent, from the capital cost allowance legislation.

There is a high degree of vertical integration between production and distribution. Distribution companies are an important source of financial support to producers; they market and promote films. The film and video distribution market is dominated by foreign-controlled (mainly U.S.) distributors. Government involvement in the film and video industry has evolved from the creation of the National Film Board, the Canada Council and Telefilm Canada.

Access to markets through large distribution companies has been difficult for Canadian films. The growing importance of Pay T.V. and home video markets as exhibition channels for film and video productions is likely to have substantial impact on the industry as well on the performing arts, visual arts and the sound recording industries. The Canadian film production industry faces significant cost barriers particularly in the private theatrical film market where large U.S. companies have achieved scale economies and vertical integration into distribution networks. Both of these variables play a major role in the international film market.

Book, Periodical, Newspaper Publishing

Book, periodicals and newspapers combined can be defined as the "print-media" industry. At one level, the Canadian industry reveals a large number of small book publishers, weekly newspapers and periodicals with small circulations. At another level, many large, mostly foreign-controlled firms, "media conglomerates", are diversified not only in all aspects of print media, but also in film making, radio, television, and non-media activities. The distribution systems in print media although varied have some common characteristics. To the extent that the industry supports the existence of both small and large firms, outside market influences such as government policy in this area are likely to elicit different results from each group of firms.

The periodical and newspaper publishing industry involves a similar process to book publishing but also exhibits significant differences. The two main sources of revenue for newspapers and periodicals are sales revenue and advertising revenue. Newspapers compete with each other and also with electronic media. While price competition is not evident, product differentiation is.

The book publishing industry is concentrated with the majority of large firms under foreign control, while the majority of Canadian-controlled firms are small or medium-sized. The industry also exhibits geographical concentration. Partly due to reasons of scale barriers and market size, medium and small-sized Canadian publishing companies have been characterized by weak financial performance. Most of the firms rely on government support to stay in operation. On the export side, the Canadian publishing industry has made only a small impression on the world market.

1.4.4 Informatics

A division among informatics goods and services is not easily established because there is considerable overlap between categories and companies which is increasing with the evolution of the industry. There is also considerable overlap between the informatics industry and the communications sector industries. The informatics hardware industry in Canada is dominated by foreign-owned companies. While there are Canadian equipment suppliers, it is in the software and service bureau areas that Canadian companies have concentrated.

A very high proportion of informatics equipment produced in Canada is exported. At the same time, much of the Canadian equipment market is supplied by imports. There is a growing diversity of both informatics products and customers which is reflected in complex and changing market channels. These factors, coupled with rapid changes in technology, size of investment, and need for service support, have caused purchasers to be very careful in selecting a supplier. The demand for major products has held a slow growth resulting in a continuing process of mergers, rationalization, and diversification. Such activities also provide an environment which increases research and development. Governments generally provide considerable support to research and development and the level of support within Canada compares favorably with that of other industrialized countries.

In general, apart from the home computer field, the informatics market is growing, in both mainframes and even more so in smaller computers, and the growth has been accomplished by an increasing demand for application software packages. There are several significant barriers to maintaining growth in the informatics industry. Growing companies also face organizational problems during the transition from a small owner-managed firm to a larger enterprise requiring more professional management. The issue of marketing channels may be the key to success for small Canadian equipment and software producers.

1.4.5 Space

The Canadian space industry systems operators and service component is essentially made up of two government corporate entities. Telesat Canada operates Canada's domestic satellite telecommunications system. It's operations consist primarily of providing network television, telephone and business communications services. Teleglobe Canada establishes, maintains, and operates Canada's external telecommunications services and coordinates their use with the services of other countries. In

terms of telecommunications revenues, Teleglobe and Telesat Canada ranked 9th and 12th, respectively, in a group of 124 companies. However, each has a monopoly in its respective international and domestic markets. The overall effect of government ownership and operation of these two companies is tight control over the development and application of satellite technology and services in Canada. As part of the government's policy to transfer technology to a maturing Canadian industry, direct departmental involvement is lessening and concentrated mainly in broad program areas. The emerging environment of the operator and service provider market hinges on possible changes in government policy and the introduction of new satellite technology.

Forty firms comprise the space equipment industry. Of these, 15 percent are more than 80 percent involved in direct space-related activities. The majority of the others divide their activities between space-related and communications-related activities. The industry is 90 percent Canadian-owned and has been growing at over 50 percent per year. Most firms are concentrated in five provinces with Ontario accounting for over 72 percent. The industry is segmented by products with the larger firms offering a wide range of products compared to medium and smaller firms specializing in certain areas. To a great extent, the structure and behavior of the space equipment manufacturing industry is characterized by the government's participation in the industry. While the technology itself also determines the direction the industry is taking, it is government policy and indirectly, government regulation that point toward the pursuit of international opportunities, private-sector investments in R & D and the commercialization of space.

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3.0 INTRODUCTION

3.1 Background

On May 31, 1983, the Deputy Minister issued a Regional Dimension Action Plan. This plan was designed to strengthen relations between regional offices and headquarters. By injecting a regional dimension to senior management decision-making, the department's policy and program planning process was to be made more responsive to regional issues and concerns. In response to this issuance, the Environmental Assessment of the Canadian Communications Sector was begun in the summer of 1983 and was completed in November 1983. It was a joint undertaking by the staff of the now disbanded Communications Economic Branch and by the Regional Program Development and Policy Analysis Divisions.

The 1983 assessment provided a comprehensive analysis of i) the trends, opportunities, and problems of the communications sector in Canada; ii) the economic perspective of each region (i.e., provinces) in the medium term, and iii) the objectives, problems and opportunities of the regions with regard to the communications sector.

The general purpose of the assessment is to serve as a background document for use in the preparation of departmental strategic plans, and in the development and refinement of policy proposals, policy analysis, and other planning documents. (As an example of its utility, the Ontario region has used its own environmental assessment report for ERDA negotiations and agreements.)

3.2 Objective

The present report is an up-dated version of the 1983 assessment. It is a joint undertaking by the staff of the Technology and Policy Assessment Branch and Regional Program Development and Policy Analysis Divisions. The objectives of this assessment follow from those set out in the previous assessment: an attempt is made to identify and analyse the main factors shaping the communications environment as well as providing an overview of the trends and issues changing the communications sector. The approach taken in the 1985 assessment, however, digresses in one fundamental respect from the 1983 assessment. At the level of analysis, the assessment is both a synopsis of the communications industries and an overview of the communications sector during the period 1983-1984. As such, it cannot provide an in-depth and, therefore, desired analysis of the issues which are identified within it. The analysis of these issues is left to future assessments.

3.3 Scope

The study covers a two-year period between the winters of 1982 and 1984. The data comprising the bulk of the assessment is derived solely from information dated within this time frame. Where data is not available, more dated information and/or current and reliable estimates and projections have been used.

3.4 Approach

The assessment was carried out from May to December 1985. It was divided into four phases: Phase I constituted a review of the existing literature, the identification of sources, the establishment of contacts both with contributors and collaborators to this document, and the preparation of the outline which was subsequently circulated; Phase II comprised clarifying and specifying the regional submissions to be incorporated and also included regional visits; in Phase III the requirements for the content of the assessment were refined, the research was undertaken and the preliminary draft was written and circulated; Phase IV of this process involved finalizing the preliminary draft by incorporating the most up-to-date information obtained by the regions and by injecting commentaries appraised by other collaborators. The report was completed in mid-December and published in January 1986.

3.5 Format

The report is divided into 9 sections. Sections 1 - Executive Summary, 2 - Table of Contents, 3 - Introduction, are self-explanatory. Section 4 - Economic Outlook, deals with the general economic climate prevalent in the World, Canada and the Provinces during the period 1983-1984. The information is in table and graph form with narrative commentaries. Section 5 - Technology Profile, describes in detail the major technological trends and innovations, applications, and issues of six technologies which have been identified as being at the forefront in the communications sector industry research and development. Section 6 - Industry Profile, groups companies by communications subsector industry and revenue; the percentages calculated are then drawn to represent the share of the market commanded by these groups of companies. This information is provided in the form of tables with some narrative explanations. An interpretation of this information is comprised within the next section. Section 7 - Market Profile, defines the structure, conduct and performance of the larger market shareholders, in particular, and the industry, in general, in terms of demand factors and of supply factors. Regional Assessment, Section 8, gathers the Regional District Office assessments for the communications sector and is intended to provide an evaluation

more sensitive to regional characteristics. Section 9 is the Bibliography.

3.6 Classification Scheme

The delineation of the communications sector employed in this assessment is as follows: Telecommunications - the subsector is defined as consisting of two separate groups: carriers and service providers, and manufacturers; Broadcasting and Cable - the subsector consists of three groups: the CBC, service providers (these include radio and television stations, and CATV), and manufacturers; Cultural Industries - the basic components of the subsector include: the performing arts, the visual arts, book, periodical and newspaper publishing, film and video production, and sound recording; Informatics - the subsector has two categories: hardware and systems manufacturers, software and service providers; Space - the subsector will be defined as consisting of three components: systems operators and service suppliers (which are discussed within the Telecommunications section), equipment manufacturers, and the government.

4.0 ECONOMIC OUTLOOK

4.1 The International Scene

World recovery from the 1981-1982 recession began in 1983 with the seven major OECD countries averaging real growth of 2.8% and 5% per year in 1983 and 1984, respectively. Notwithstanding employment growth, unemployment remains a serious problem for industrialized countries in early 1985. The average rate of increase in consumer prices fell to 3.2% in 1983 and 4.3% in 1984. Policy action leading to a recovery in the United States resulted in high levels of interest rates both at home and internationally. Slackening output growth in the U.S. since mid-1984 has seen interest rates moderate somewhat. Recovery in the U.S. also resulted in a strengthening of its dollar and a growing deficit in its trade accounts with demand for imports growing, while foreign demand for exports remain weak.¹

U.S. growth prospects will continue to strongly influence short-term prospects in other countries. Forecasts indicate a continuing slowdown in the pace of real U.S. growth from 6% in 1984 to 3% for 1985-1986. Japan and the European OECD countries are expected to continue their respective rates of expansion recorded in 1984. Continued moderation in inflation rates is forecast with increases of 4% for 1985 and 4.5% for 1986.² Interest rate levels will depend on policy action taken in the U.S. and, therefore, is difficult to predict. Some scenarios forecast the easing of interest rates downward over the short-term as the U.S. attempts to deal with its appreciating currency problem.³

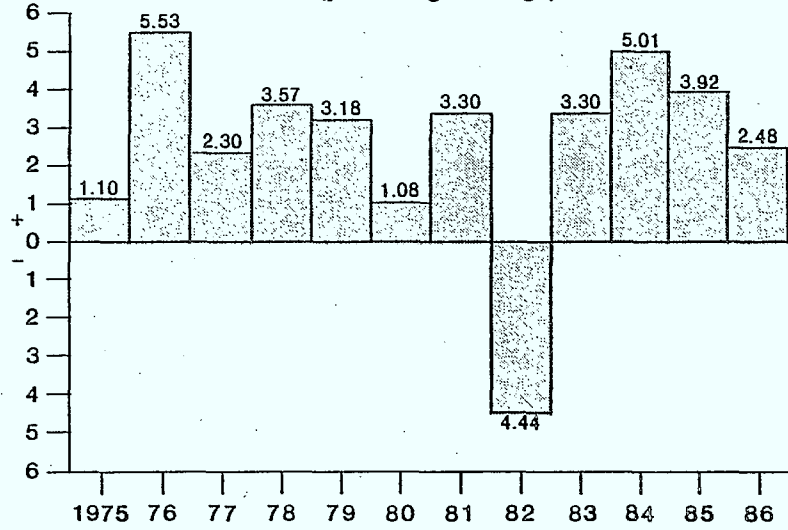
4.2 Canada

The 1983-1984 recovery in Canada was stronger than average previous experience with real GNP increasing 3.3% in 1983 and 5% in 1984. It was also less balanced and more dependent on inventory rebuilding, consumer expenditures and exports. Changes in inventories reflected the partial rebuilding of record run-off stocks that occurred during the recession. Consumer expenditures showed their largest increase since 1976 growing at a rate of greater than 3%. Growth in net exports was largely due to Canada's closer ties to developments in the U.S. leading to a larger than normal role played by trade in real economic growth.

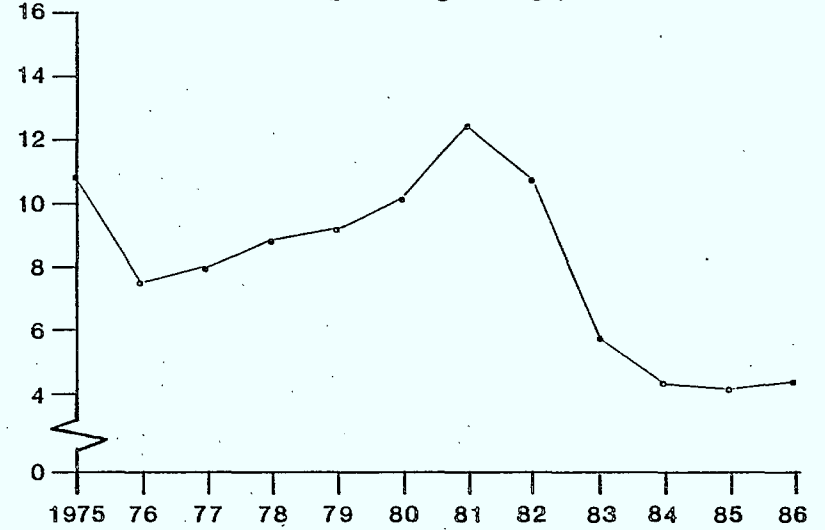
The strength of the U.S. recovery, export growth of high technology goods, and an improvement in Canada's competitive position led to a rise in exports. The weak link in aggregate demand was business investment which showed no real increase over the period and remained 21% lower than its pre-recession level. This weakness has been attributed to a number of factors: large amounts of excessive capacity, deterioration of the financial health of the corporate sector during the recession, weak primary product prices in several resource sectors, and high levels of

Trends of Canadian Economic Indicators

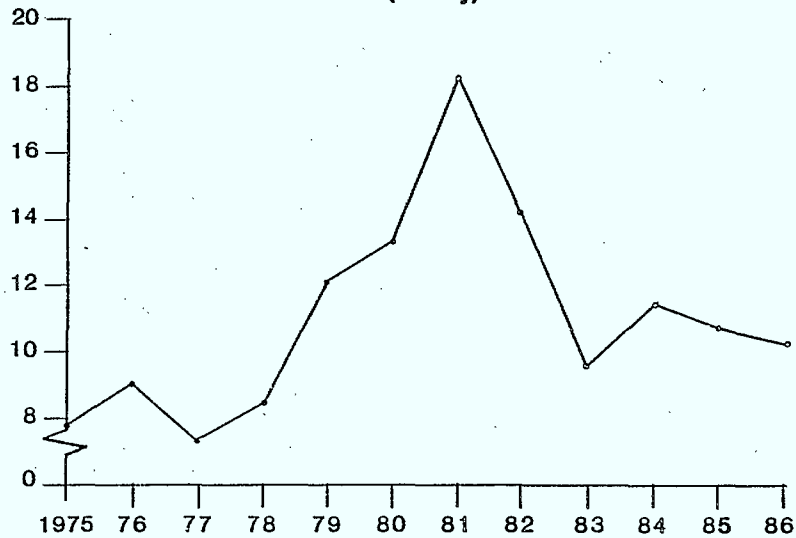
**Real GNP Growth
(percentage change)**



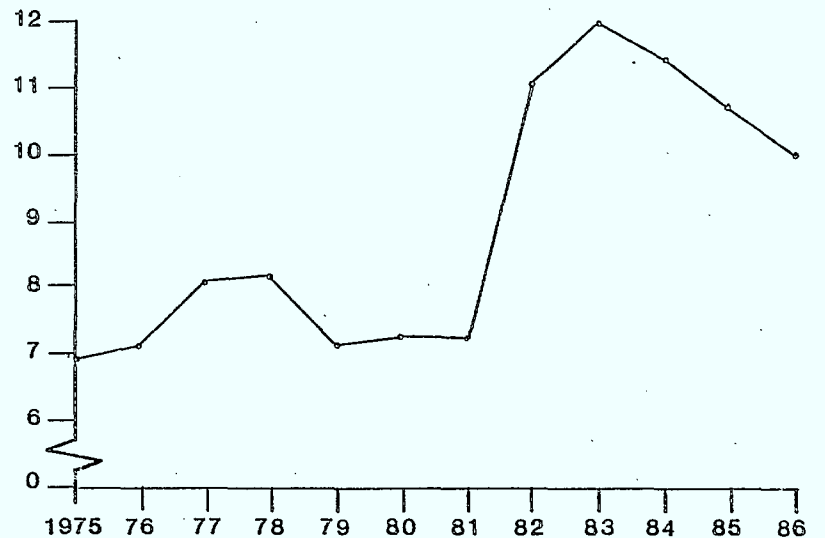
**Consumer Price Index Growth
(percentage change)**



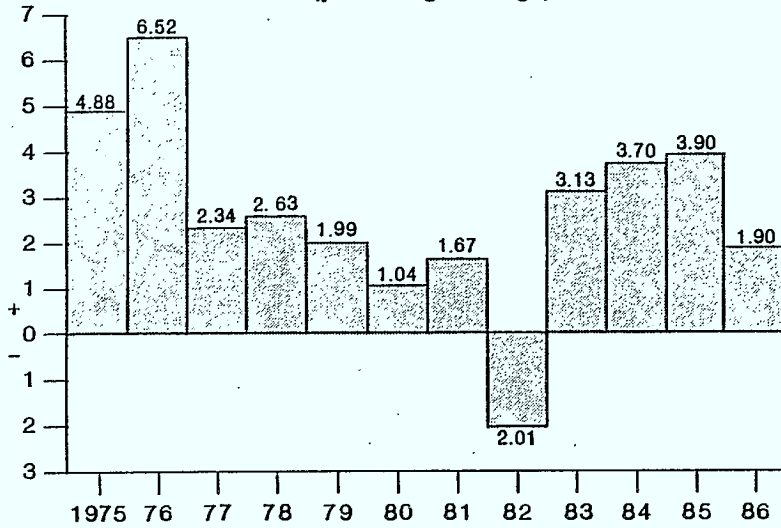
**Prime Corporate Paper Rate
(90 day)**



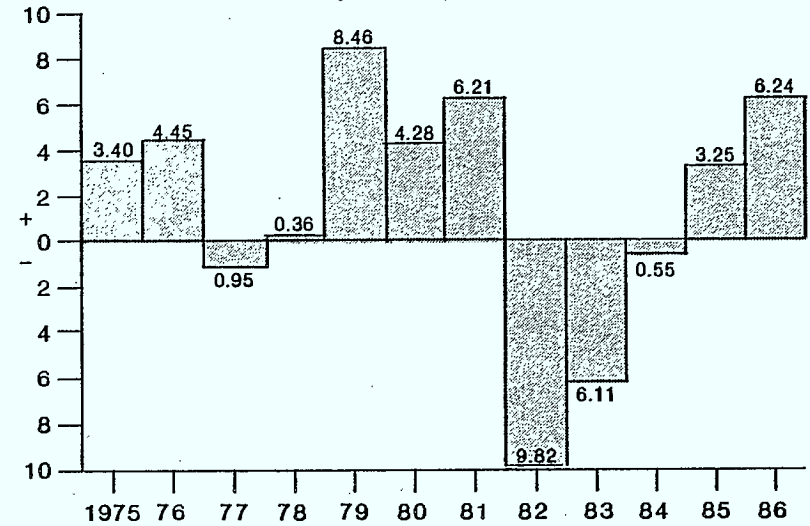
Unemployment Rate



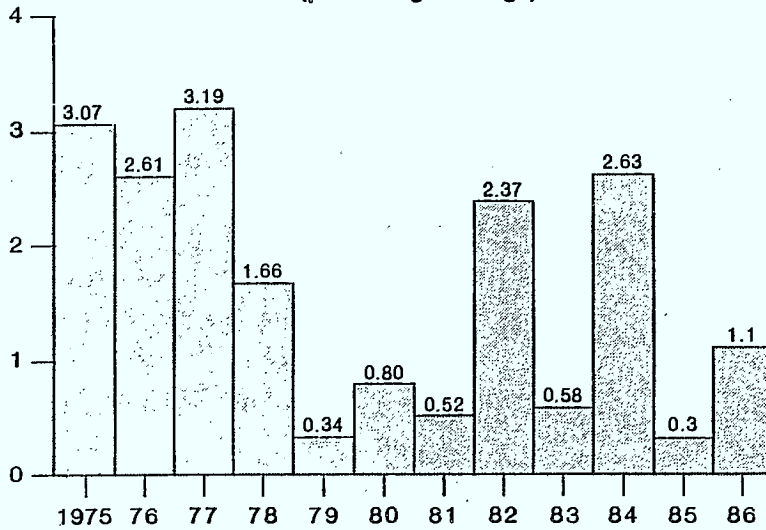
**Real Consumer Expenditure Growth
(percentage change)**



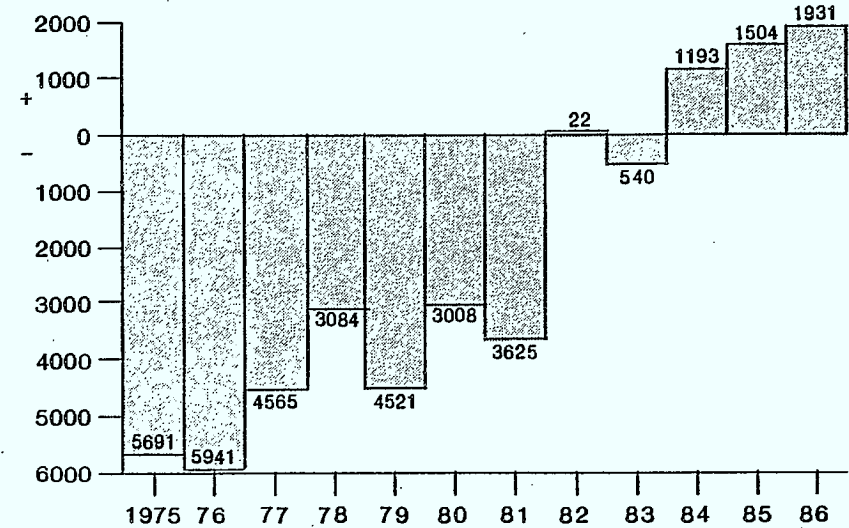
**Real Business Investment Growth
(percentage change)**



**Real Government Expenditure Growth
(percentage change)**



Net Exports (millions of constant 1971 dollars)



Sources: Bank of Canada Review, Department of Finance, *Canada's Economic Prospects 1985-1990*, May 1985.
 Statistics Canada, *National Income and Expenditure Accounts*, Cat. 13-001.
 Conference Board of Canada, *Quarterly Canadian Forecast: Executive Summary*, July 1985.

interest rates.⁴ Short-term interest rates declined from peak levels established during the recession, but remained at the 11% level by the end of 1984. Increases in prices declined from double digit levels to 5.7% in 1983, 4.4% in 1984, and below 4% in early 1985. From December 1982 to April 1985 employment grew 7.3% outpacing a 4.9% increase in the labor force. Most of this growth came in 1985 resulting in only a moderate decline in the unemployment rate to the 11% level.

The figure Trend of Canadian Economics Indicators on pages 5 and 6 summarizes the Canadian economic performance from 1975 to 1984 and extrapolates to the years 1985 and 1986. The general outlook for the Canadian economy will continue to reflect American performance. Short-term forecasts call for sustained but moderate real growth with some declines in unemployment and interest rates, and stable inflation. The role played by those sectors fueling Canada's growth to date are expected to diminish. While declines in personal savings rates and a 4% increase in real disposable income are expected to lead to consumption growth in 1985, the implementation of restrictive measures contained in the 1985 Federal Budget will inhibit further expansion in 1986. Dramatic reductions in real net export growth are also expected due to the inability to further enhance U.S. market shares and a slowing U.S. demand in 1986. Federal budget measures are expected to result in a strong recovery for investment spending with real growth rates of 3.3% in 1985 and 6.3% as 1986 being predicted. Investment spending will partially offset trends in consumption and net export growth leading to predicted real growth rates of 3.9% in 1985 and 2.5% in 1986 for the overall economy. Inflation is forecast to remain moderate averaging 4.3% with price increases constrained by excess capacity, strong productivity performance, and favorable developments in international food and oil markets. Employment growth is expected to narrowly outpace growth in the labor force leading to only a moderate decline in the unemployment rate to 10.0% by the end of 1986. Canadian monetary authorities can be expected to follow their U.S. counterpart and ease down interest rates to the 10% level.

The medium-term outlook to 1990 depends on assumptions made about the importance and possible evolution of international interest rates (i.e., U.S. policy action towards domestic interest rates will inevitably exert strong influence in Canadian interest rates.⁵) Alternative scenarios on the favorability of the international environment board in different courses of policy action in the U.S. have led to the Canadian medium-term projections as shown in Chart 1 (see p. 8).

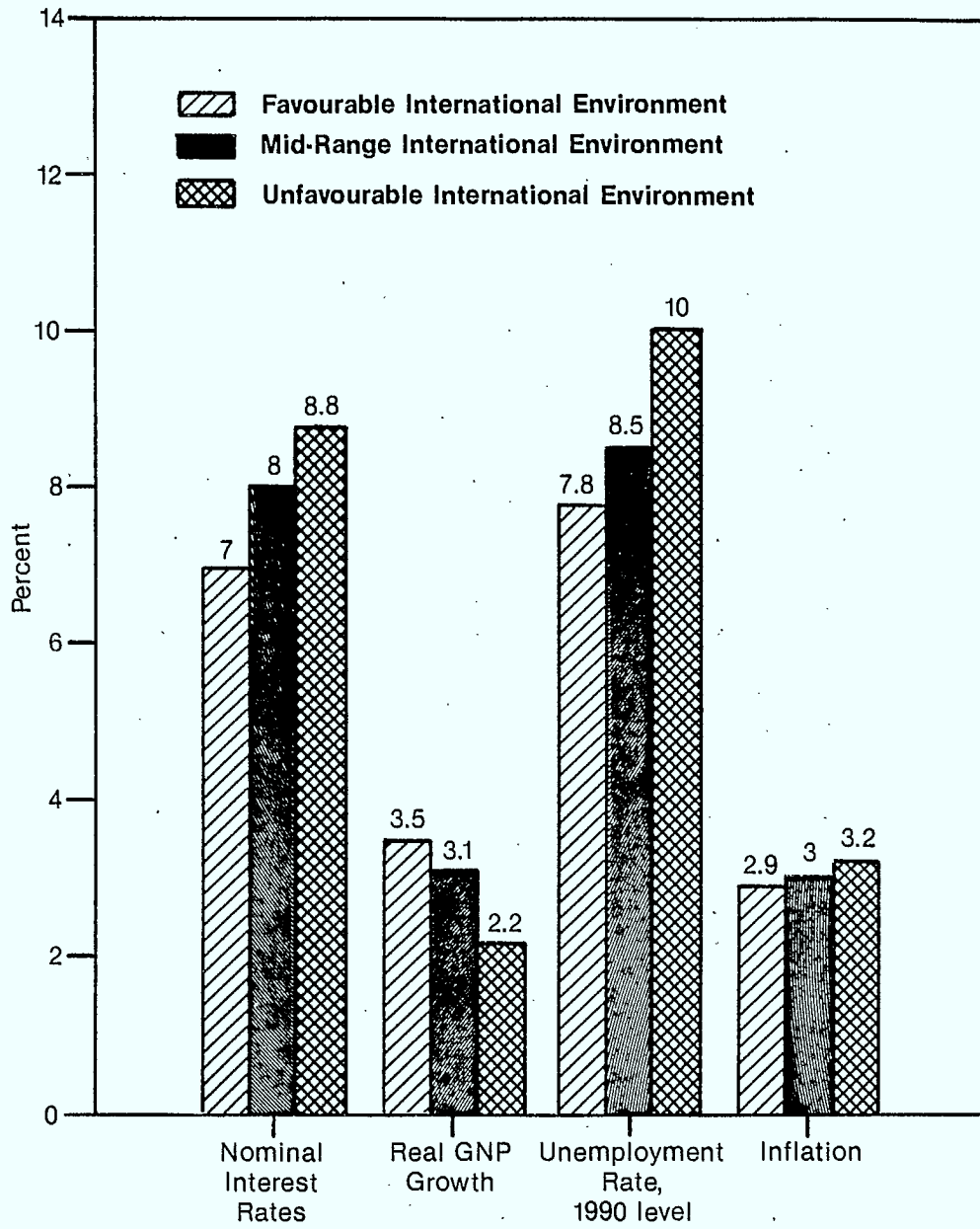
4.3

The Provinces

British Columbia

Economic recovery in B.C. proceeded at a slower pace than the rest of the nation over the 1983-1984 period. In 1983, the

Chart 1
Medium-Term Canadian Economic Scenarios 1987-1990



Source: Department of Finance. Canada's Economic Prospects, 1985-1990. May 1985.

goods-producing industries led the recovery with a real increase in Gross Domestic Product (GDP) of 7.6% (see Graph I, pp. 11-12). This was due to gains made in manufacturing production (7.1%) and a recovery in the forestry sector (26.5%). Continuing depressed prices for these goods and setbacks in restoring pre-recession levels of output hindered growth of the services sector. Consequently, real GDP in the province increased by a modest 1.6%.

The following year was characterized by work stoppages and labor disputes which limited growth in both the forestry and fishery sectors and also prevented an expansion in manufacturing activity. However, a real increase in mining production of 19.2%, accounting for 30% of the overall increase in provincial growth, managed to boost real GDP up by 2.1%. Despite a decline in personal disposable income growth retail sales managed to stage a moderate recovery of slightly over 2% a year (see Graph IV, pp. 23-24). The unemployment problem continued increasing its rate to just under the 15% level (see Graph III, pp. 19-20). A bright spot in the provincial economy was the inflation rate which continued to decline and remains below the national average (see Graph II, pp. 15-16).

B.C. is expected to exhibit stronger growth over the short-term providing work stoppages do not occur as a number of major contracts expire in 1985. Should they occur, the services sector would show the greatest decline in activity particularly its community business and personal services component. The resource sector will be weaker in 1985-1986 due to slumping metal markets and the unlikelihood of attaining record levels of activity achieved in 1984. Other goods-producing industries are expected to pick up some of the slack. Manufacturing is expected to post strong productivity in 1985, and with stronger capital spending and an upsurge in housing, the construction sector should recover. Improvements in consumer spending will stimulate the production of consumer goods and services in 1985-1986. Wholesale and retail trade are expected to grow by 6.4% sustaining servicesector growth at 3.3%. Expo 86 is to benefit economic activity especially in transportation, communications, accommodation and food services. As a result, forecasts call for real GDP in 1986 to exceed that registered in 1985 by 2.5%.

Alberta

Unlike the rest of the country Alberta continued to dwell in recession in 1983-1984. High unemployment rates, a fall in investment income, and a lack of farm income growth contributed to a sharp decline in real disposable income. This affected the residential construction, retail trade, and food and beverage manufacturing sectors. Investment dropped off declining 6% in

engineering construction and 7.9% in machinery and equipment which led to a 4% decline in real GDP for 1983.

Signs of recovery began to surface in 1984 as upswings in mineral fuel production, exploration, and development paced the mining sector to an increase in/output of 8%. Within this sector, mining production grew by 11.8%, crude petroleum and coal output by 4.7%, and natural gas by 2.6%. Increased activity in the oil and gas industries was attributed to a more favorable investment climate created by lower interest rates and renewed optimism. A fall in agricultural production due to the drought and a continuing depressed construction sector limited overall growth in the province to a tiny 0.8%. Over the two-year period the unemployment rate continued to rise reaching just over the 11% level in 1984. With an annual average rate of increase of 2.5% the province's inflation rate continued to be among the lowest in the country.

The oil and gas industries in Alberta are expected to continue their expansion in 1985 leading the province to increase output by 2.1%. A significant project development in Cold Lake and plant expansions planned by Syncrude Canada and Suncor Inc. are expected to have positive impacts on the economy.⁶ The outlook for the manufacturing sector is mixed with industries linked to the oil and gas resources sector to experience higher growth rates. Employment growth in these industries is expected to drop the unemployment rate to 10.3% in 1986. Combined with forecast growth in personal disposable income, the service sector should recover, particularly the commercial services industries such as retail trade where purchases postponed during the recession are expected to be made. The above trends will taper off in 1986 leading to a real GDP increase of 2.0%.

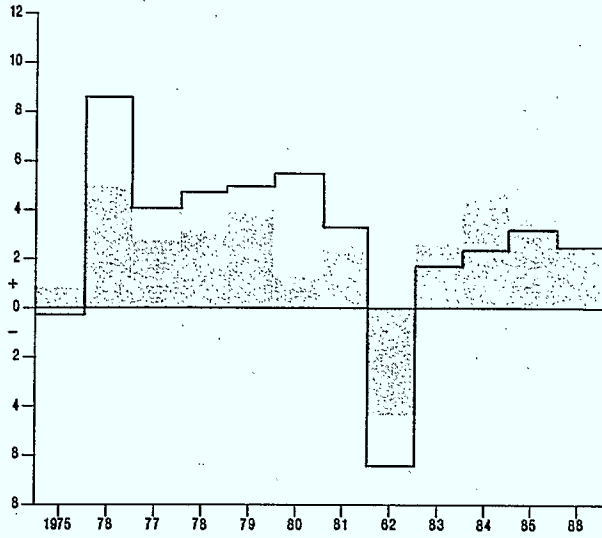
Saskatchewan

Growth of the Saskatchewan economy was hampered by droughts in both 1983 and 1984 with crop production dropping by 7% and 13%, respectively. This saw personal disposable income growth decline by an average of 1.5% per year over the two-year period. It also curbed consumer expenditures in 1984 with retail sales showing virtually no growth after increasing a respectable 8% in 1983. In general, the service sector sustained the overall economy for 1983-1984 showing real growth of 3.1% in 1983 and 2.1% in 1984. Even though the mining sector showed a recovery to pre-recession levels with output increasing at rates of 13.9% in 1983 and 27.3% in 1984, production losses in construction, trade, and public administration held provincial economic growth to 2.4% in 1983 and 1.5% in 1984. Unemployment rates rose to the 8% level but continued to remain among the lowest in the country. The rate of price increases fell to 4% in 1984 but rose relative to the rest of the country.

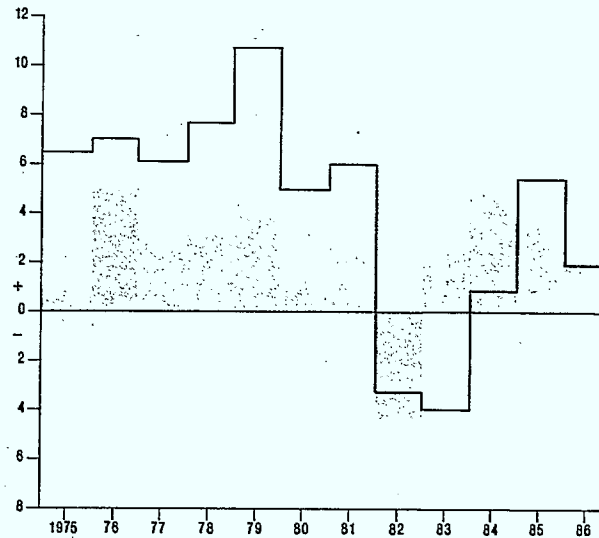
GRAPH I

REAL GROSS DOMESTIC PRODUCT GROWTH (PERCENTAGE CHANGE)

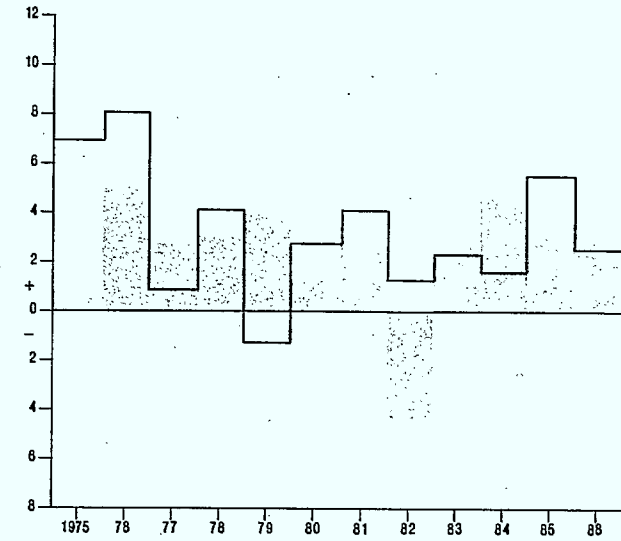
BRITISH COLUMBIA



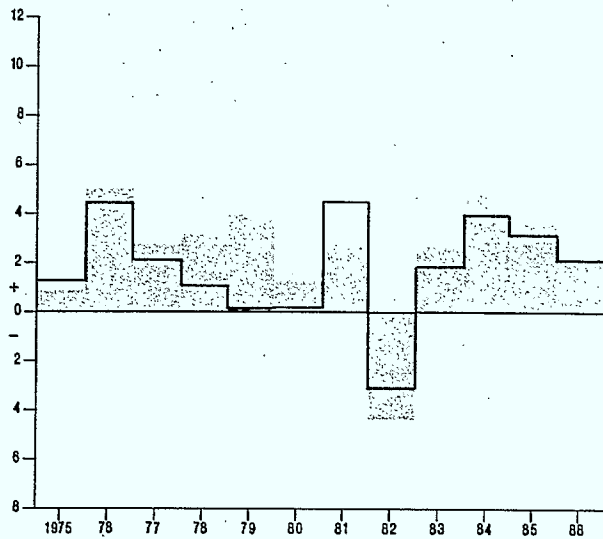
ALBERTA



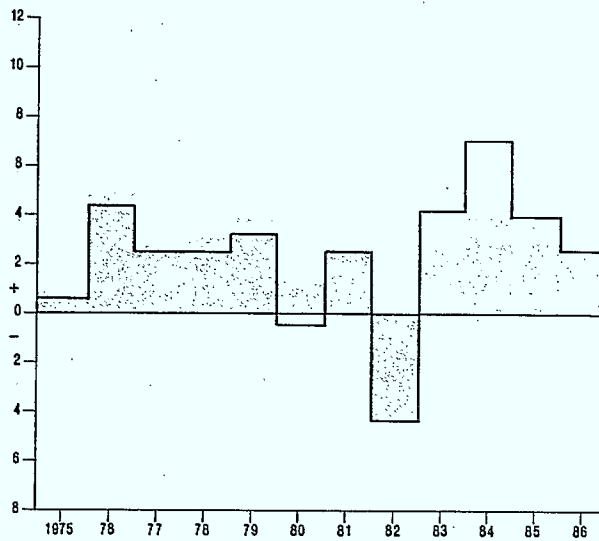
SASKATCHEWAN



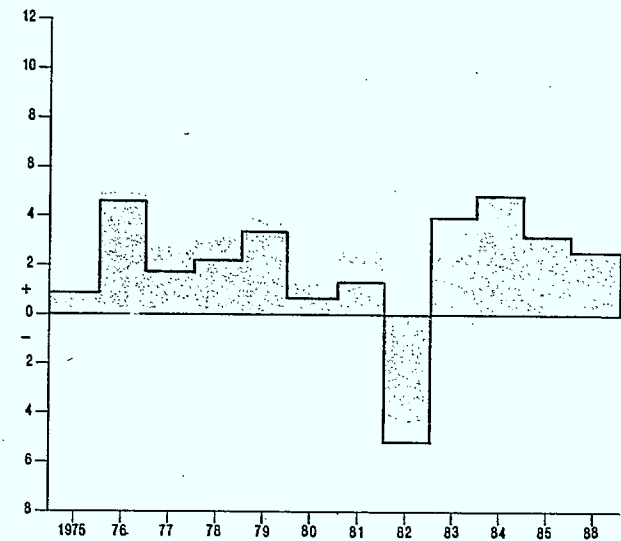
MANITOBA



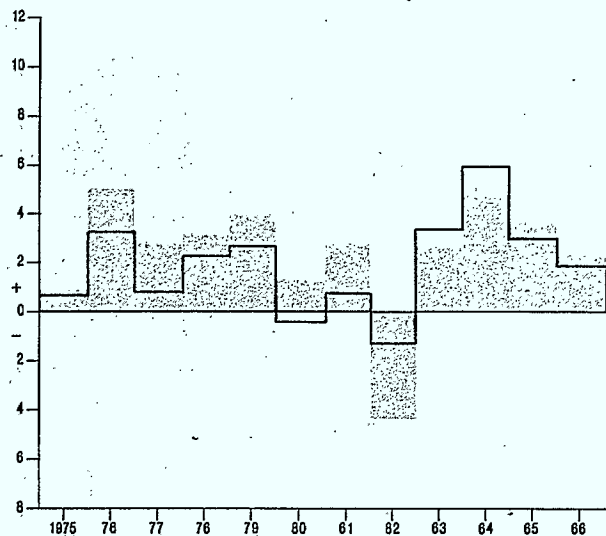
ONTARIO



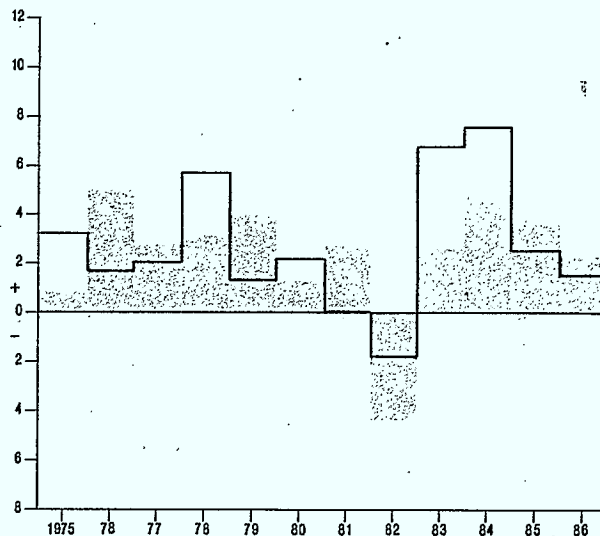
QUEBEC



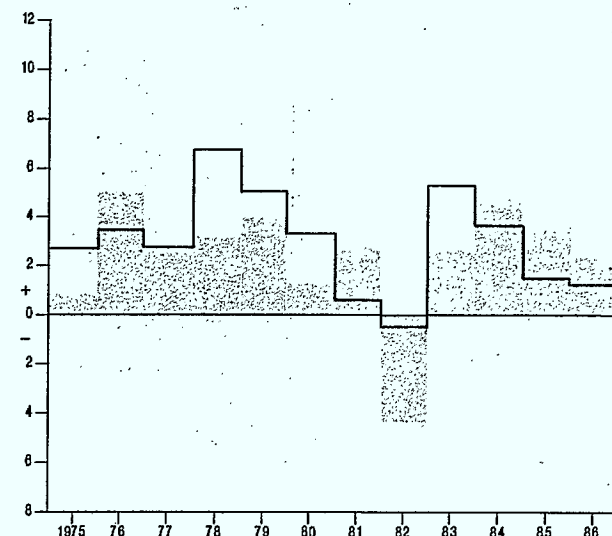
NEW BRUNSWICK



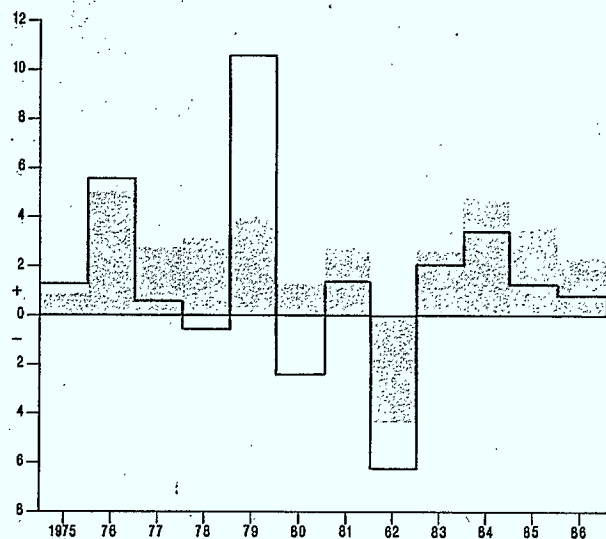
NOVA SCOTIA



PRINCE EDWARD ISLAND



NEWFOUNDLAND



Source: Conference Board of Canada. *The Provincial Economies and Quarterly Provincial Forecasts: Executive Summary*, July 1985

Note: Shading on all Graphs (I to V) denominates the Canada percentage change over the same period.

On the assumption that crop production returns to normal yields, Saskatchewan is expected to record the highest rate of advance in the country (5.4%) in 1985. Agricultural output is forecast to expand by nearly 15% and to add more than half of the expected \$138 million increase in GDP. The manufacturing sector is expected to grow by 3.1% led by a 4.1% increase in its food and beverage component. Strong growth for the construction industry is predicted to come from the Husky Heavy Oil Upgrader Project and via the expansion of the New Grade Refinery.

An upswing in personal income is expected to result in greater consumer spending and a recovery in retail trade activity. A more moderate 2.5% increase in output is projected for 1986 after the economy recovers from the 1984 drought in 1985. Employment growth is predicted to lead to a drop in the unemployment rate to 6.9% in 1986.

Manitoba

The importance of the trade and distribution sectors to the Manitoba economy were particularly evident in 1983 and 1984. In the goods-producing industries production declined (i.e., agriculture declined by 16.3% in 1983) and, despite strong increased growth (i.e., mining increased by 33.4% in 1983) still remained below pre-recession levels. Combined with the fact that these industries do not account for a large fraction of the provincial GDP put the onus for growth on the services industries.⁷ Moderate but consistent increases in growth were registered by provincially significant industries such as transportation, storage, communications, wholesale and retail trade, and community business and personal services. Growth in these sectors can be attributed to the inflation rate and the unemployment rate remaining below national average and to the growth in personal disposable income. Inflation fell from 8.8% in 1982 to 3.6% in 1984 while unemployment hovered about the 8-9% level. The economy as a whole showed improvement in real growth increasing by 1.7% in 1983 and 3.9% in 1984.

In 1985, farm production is expected to drop off slightly from the 17.1% increase registered in 1984. This will be indirectly responsible for half of the province's slower growth rate of 1.6%. The wholesale and retail trade sector is expected to increase at rates less than 3% largely due to the dependence of the wholesale sector on the state of Canada's grain trade. No improvements in lowering the unemployment rate are expected until 1986.

Construction activity is expected to increase in both the industrial and the residential sectors. A fall in net farm income and federal income taxes will slow down personal disposable income growth thereby restraining growth in the

service-producing industries especially in 1986. Forecasts call for real GDP growth rates of 3.0% in 1985 and 2.1% in 1986.

Ontario

Compared to the rest of the country Ontario showed above average increases in real GDP of 4.3% in 1983 and 7% in 1984. Unlike most other provinces, all sectors showed positive growth rates in both years except for construction in 1984. The goods-producing industries also outpaced the service-producing industries. Mining, in particular, exhibited strong growth rates of 22% and 27% in 1983 and 1984, respectively. However, increased growth rates were largely because of an increase in demand by consumers for durable goods created by a fall in nominal interest rates and stable increases in personal disposable income.⁸ A 26% increase in motor vehicle sales, particularly large- and medium-sized cars, led all consumer durables. Part of the demand was exported to the U.S. resulting in a 33% increase in provincial goods exported (See Graph V, pp.25-26). Retail sales growth also increased by 10% over the two-year period. Unemployment rates remained around the 9 to 10% level despite employment growth of 3.5%. The phenomena of labor force growth exceeding employment growth leading to only moderate drops in unemployment rates was common throughout the country. Despite decelerating growth over the period inflation remained above the national average.

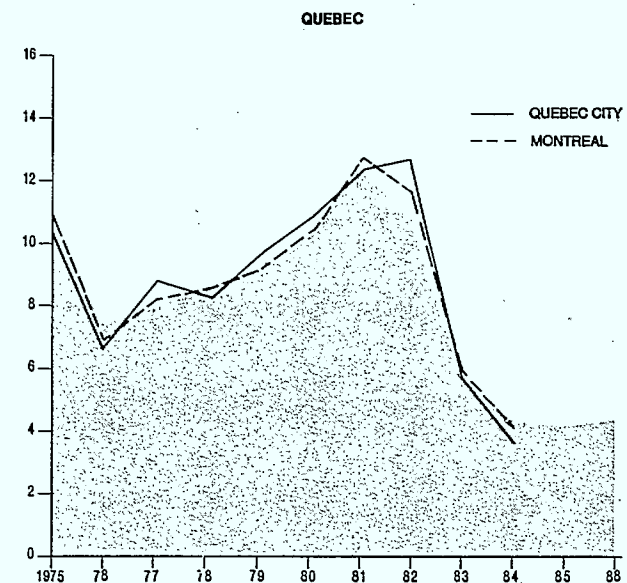
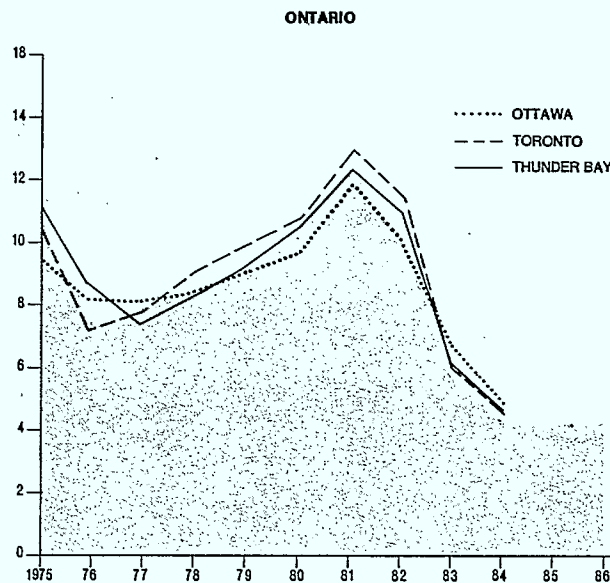
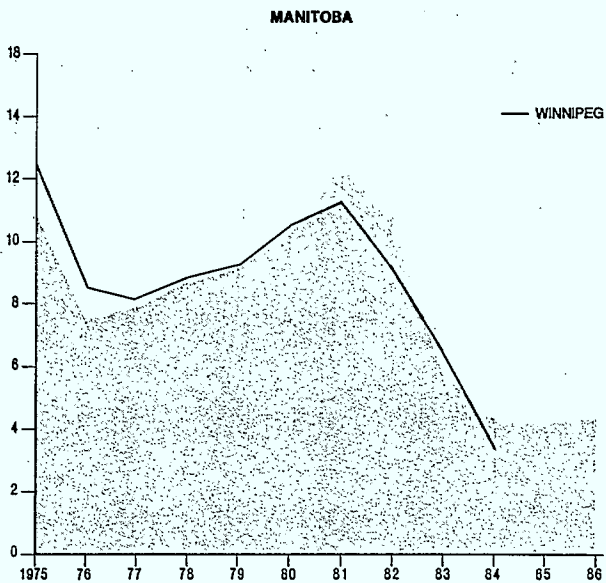
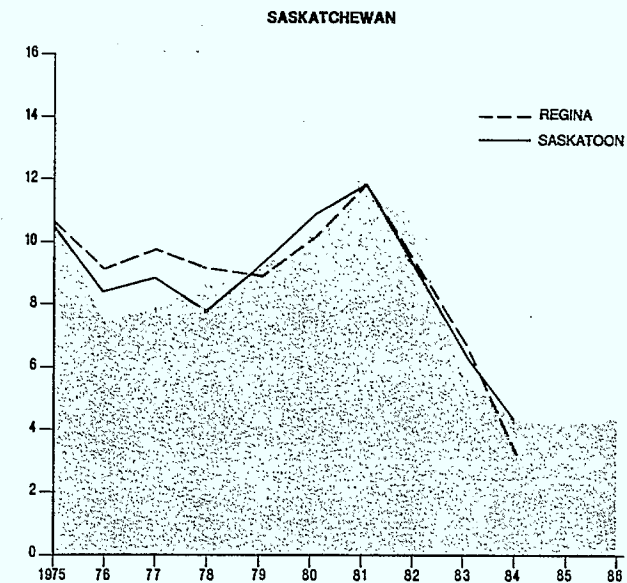
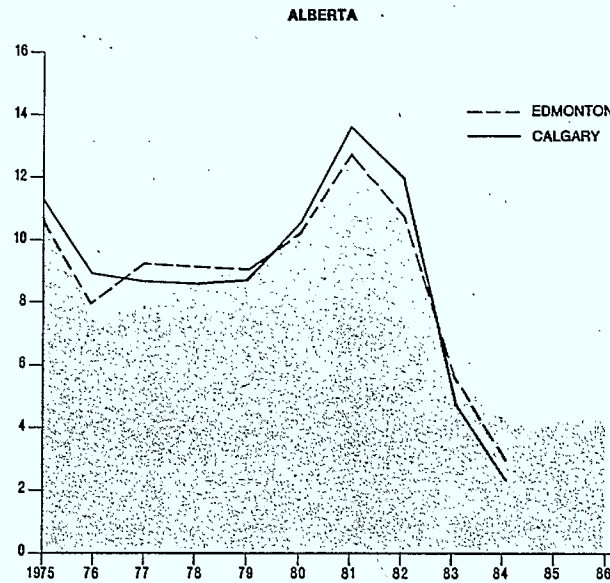
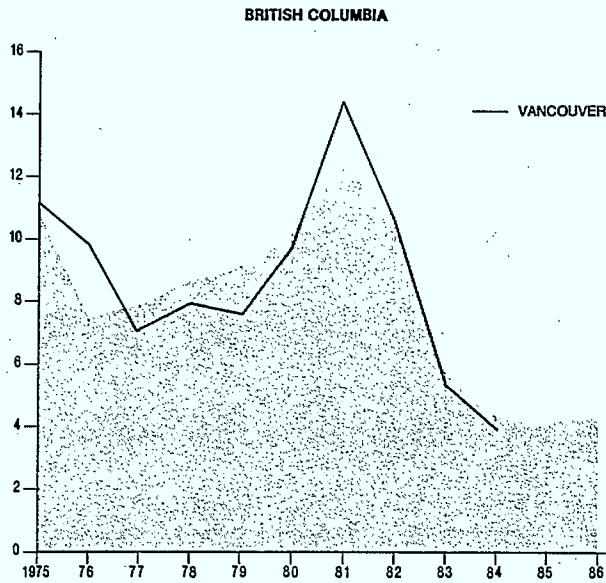
The outlook for 1985 calls for a more moderate 2.7% increase in real GDP. The basis for this prediction is slower growth in the province's industrial sectors. For example, mining is expected to grow by only 1.9% because of depressed international commodity prices.⁹ One exception is the construction industry which is predicted to increase by 5.1%. Construction activity and the manufacturing of building materials and machinery are expected to be stronger because of an upturn in business investment. Housing starts are expected to increase in 1985-1986 as well. Diminishing increases in pent-up consumer demand and personal disposable income are expected to affect consumer spending resulting in smaller rates of expansion for producers of household goods and services.¹⁰ Increases in employment are expected to continue with the creation of 300,000 jobs in 1985-1986 dropping the unemployment rate to 7.1% by the end of 1986. The Ontario economy is to slow down further in 1986 with real GDP increasing by 2.6%.

Quebec

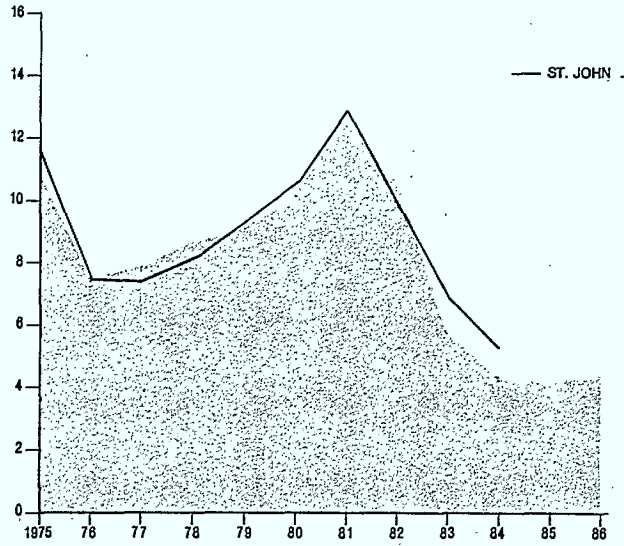
In 1983 Quebec began a strong recovery posting a 4% increase in real GDP. This continued in 1984 when the economy grew by 4.8%, its highest growth rate since 1974. Growth was led by the manufacturing, wholesale, and retail trade sectors. The

GRAPH II

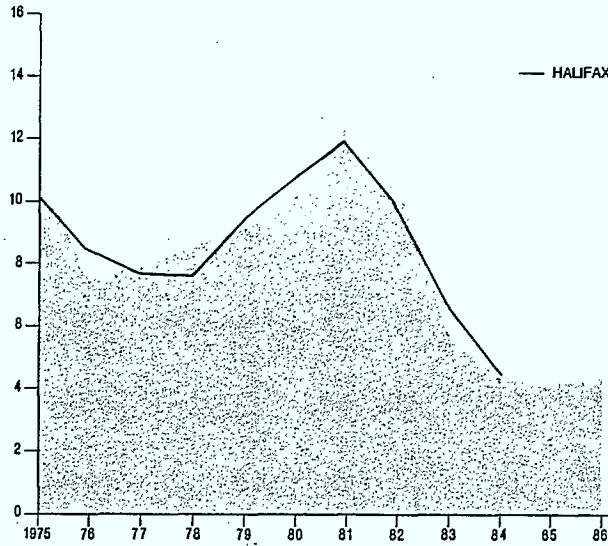
CONSUMER PRICE INDEX GROWTH (PERCENTAGE CHANGE)



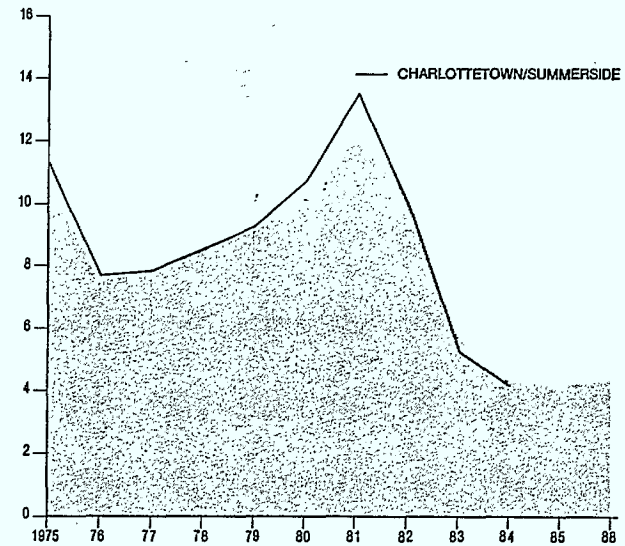
NEW BRUNSWICK



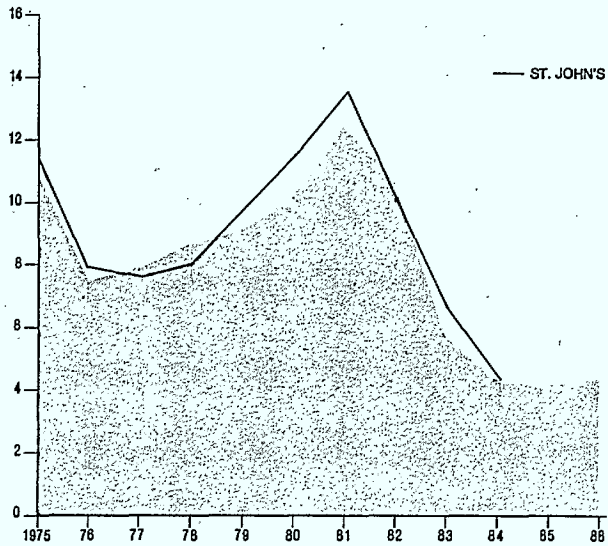
NOVA SCOTIA



PRINCE EDWARD ISLAND



NEWFOUNDLAND



Source: Statistics Canada, *The Consumer Price Index*, Cat. 62-001
 Jan-Mar 85, Department of Finance, *Canada's Economic
 Prospects: 1985-1990*, May 1985

manufacturing sector, which accounts for about one quarter of total provincial output, grew at an average annual rate above 5%. Wholesale and retail trades led service industries to growth rates of 3% in 1983 and 4.4% in 1984 by posting an average annual rate above 7.6%. In 1984 mining showed a positive real growth rate of 12.7% for the first time since 1979. Unemployment continued to be a major problem persisting around the 14% level. The rate of increase in the consumer price index (CPI) over the two-year period fell from 12% in 1982 to 4% in 1984.

The Quebec economy is expected to show a slower pace of growth in 1985 with a predicted 2.1% real GDP growth rate. Though the province has entered a more mature phase of recovery, the predicted growth rate is still above its own average over the last 10 years.¹¹ Weaknesses in primary industries and construction activity form the basis of the forecast. In the primary resources sector only mining is expected to show a positive growth rate (3.9%). The end of the provincial government housing program is expected to cause an 8.4% decline in housing starts and a 1.1% drop in overall construction activity. A moderate increase in manufacturing activity is expected to benefit the wholesale and retail trade, transportation, communications, and storage sectors.

As the economy enters 1986, the services sector will begin to experience a reduction in growth. Declining interest rates and increases in personal disposable income are anticipated to lead to a recovery in housing starts and the manufacturing of building materials. The economy will, nevertheless, experience a further drop in its growth rate to 2.5%. Employment growth will gradually lower the unemployment rate to 11.1% in 1986.

New Brunswick

The New Brunswick economy underwent a transition in 1983. Prior to that year, provincial economic growth in the 1980's was generated, on average, by the services sector.¹² While services industries continued to show moderate increases in growth, notable increases in goods-based industries such as forestry (16.9%), construction (9%), and fishing (24%) boosted the overall GDP growth rate for the economy to 3.4%.

In 1984, the province experienced its greatest growth since 1974 posting a 6% real growth rate. Much of the growth was due to increases in resource-based production and an improved export performance. Overall, the goods-producing industries stepped up production by 10.8% with manufacturing (16.2%), utilities (10.4%), and mining (10%) leading the way. An exception was the construction industry which only registered a 4.1% increase compared to a 9% rate set in 1983. Services industries continued their moderate pace of growth by recording a

3.9% increase. Despite the banner years enjoyed by some sectors unemployment remained around the 15% level. The rate of inflation, while declining, still remained above the national average.

Predicted growth prospects for 1985 are seen to come from the services sector with a drop in the surge of the goods-producing sector. Despite increases in farm output led by a 3.7% growth in potato production and a recovery in the fisheries sector with a predicted growth of 8.4%, their relative importance in the provincial GDP will result in no significant increases in overall growth. Therefore, the 2.6% increase in output predicted for the services industries will be largely responsible for an increase of just over 3% for the economy as a whole.

In 1986 the service sector is to show decelerating growth and a decline in demand for consumer services. The food and beverage component of the manufacturing sector is expected to show only modest growth. This will be partially offset by the heavy manufacturing component which is expected to show an upturn as the frigate building program in Saint John begins; with the potential of reviving a depressed construction sector as well.¹³ Forecasts call for a decline in real GDP growth rate to 2.1% in 1986.

Nova Scotia

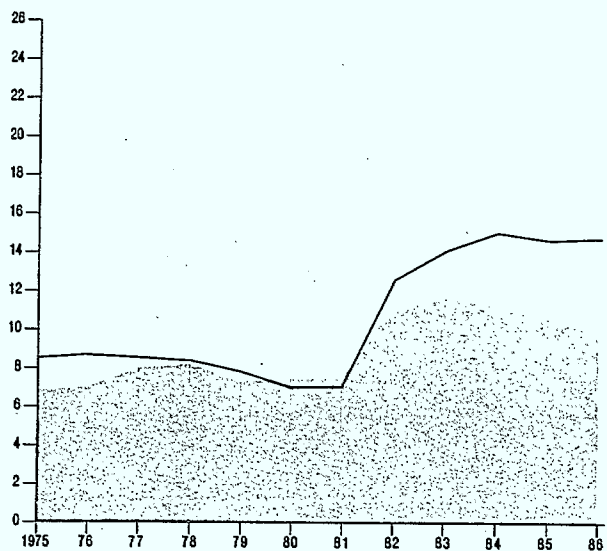
The Nova Scotia economy grew faster than any other province in 1983 and 1984. The key to this performance was offshore oil exploration and gains made in specific goods-producing and services-producing industries. For example, mining GDP rose by 12.9% in 1983 due to the increased activity in offshore exploration. Good years were also turned in by construction (31.3%), manufacturing (12.9%) and forestry (11.1%). Overall, the goods-producing industries showed a strong 15% increase in real output. On the services side, the expansion in retail sales was extraordinary thru 1983 and the first half of 1984 registering growth sales of 13.9% and 15.1%, respectively. Motor vehicle sales, which increased by 21%, accounted for a healthy portion of the overall increase. The increase in consumer expenditures can be attributed to personal disposable income growth reaching 8%.

The economy exhibited yet stronger growth in 1984 posting a nation-high 7.6% as offshore exploration activity peaked. Growth was less balanced, however, with only four of twelve sectors growing at a rate larger than that exhibited by the economy as a whole. Driven by a surge in export demand on the one hand, paper and allied production increased manufacturing activity by 17.3%. On the other hand, the fishing sector had its structural and financial problems which resulted in an estimated loss of 40 million dollars in real GDP in the fourth

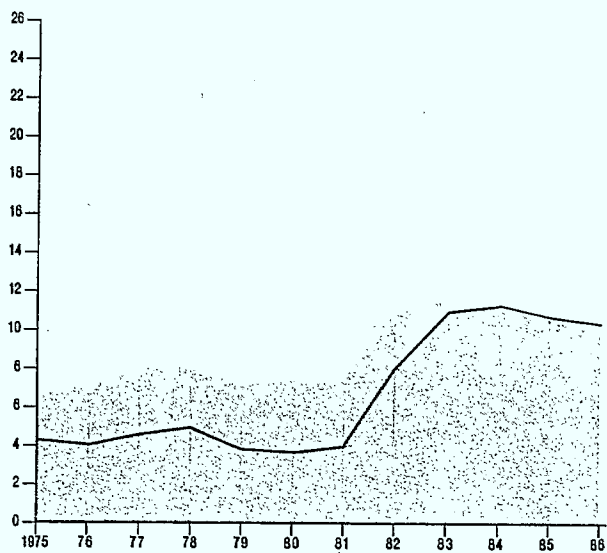
GRAPH III

UNEMPLOYMENT RATE (PERCENTAGE CHANGE)

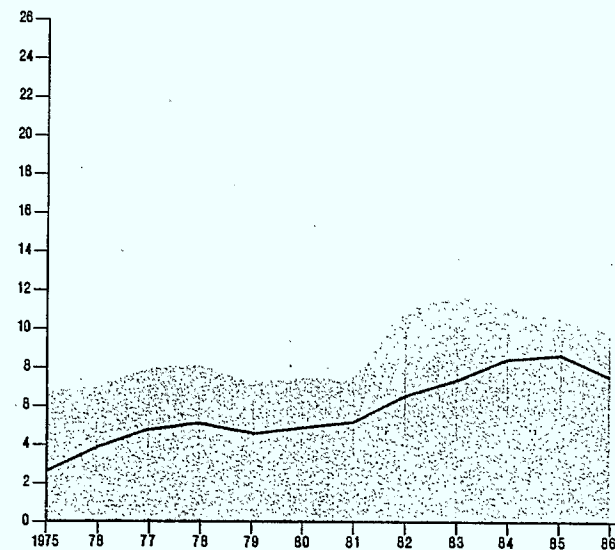
BRITISH COLUMBIA



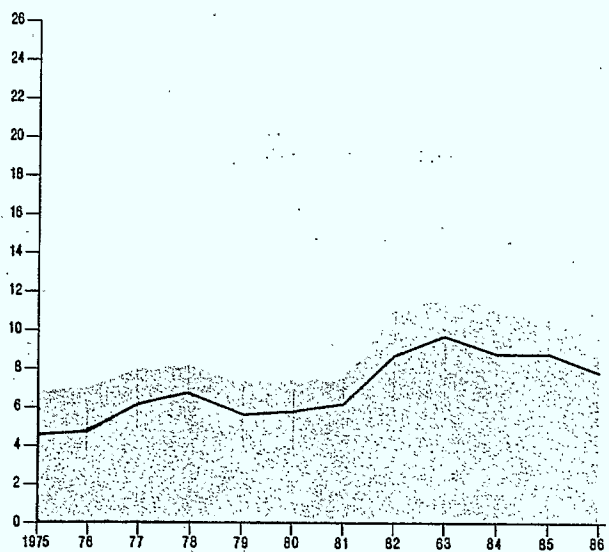
ALBERTA



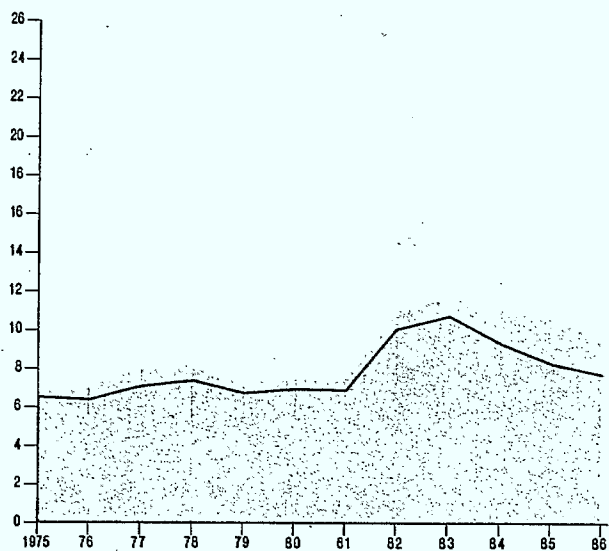
SASKATCHEWAN



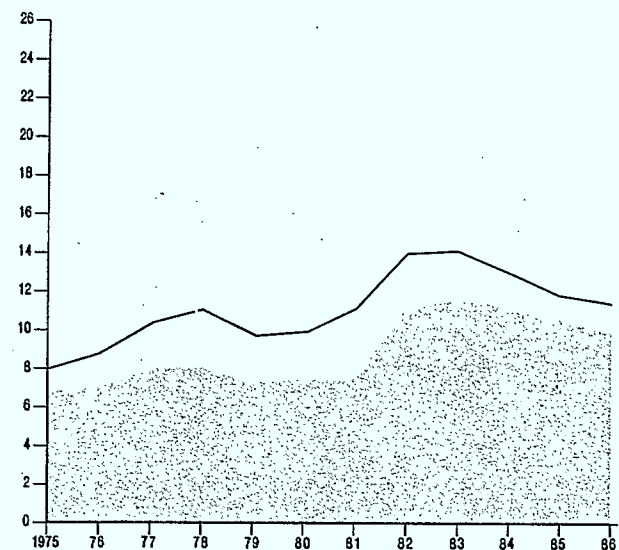
MANITOBA



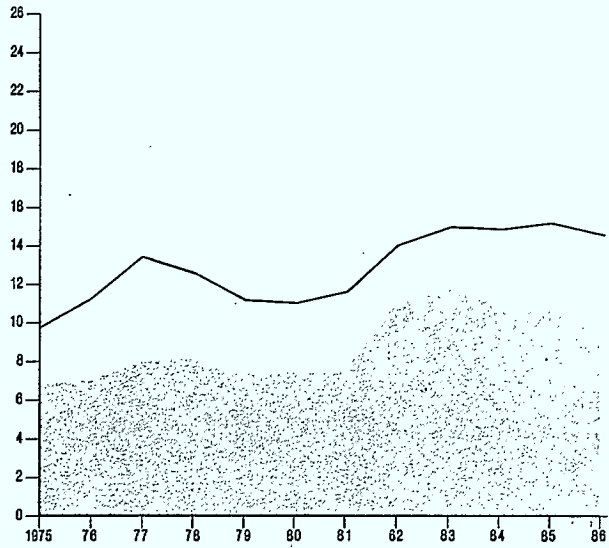
ONTARIO



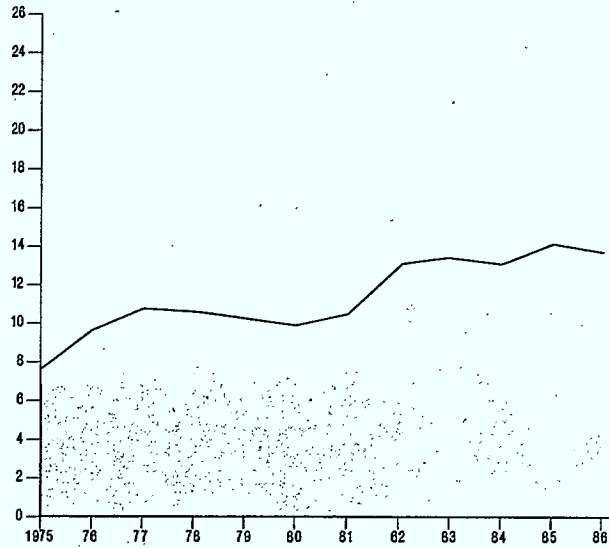
QUEBEC



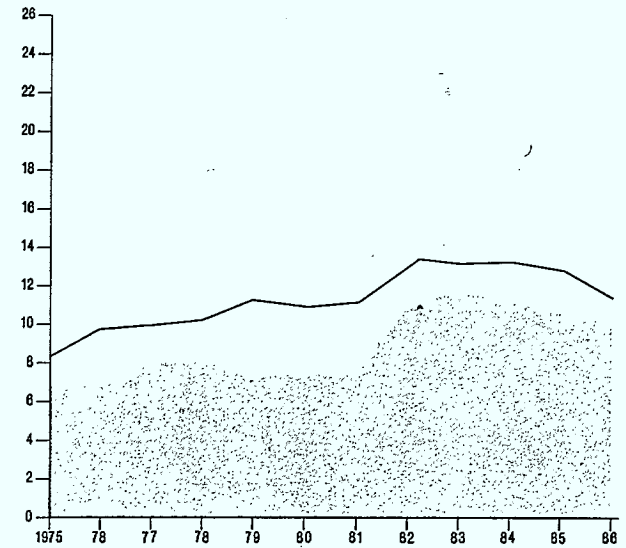
NEW BRUNSWICK



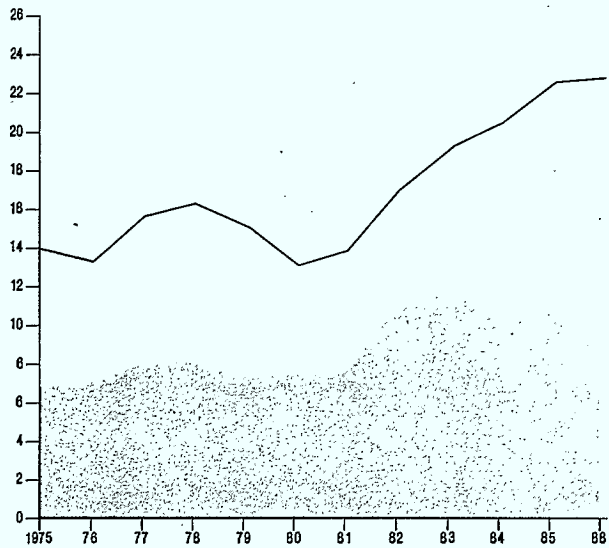
NOVA SCOTIA



PRINCE EDWARD ISLAND



NEWFOUNDLAND



Source: Conference Board of Canada. *The Provincial Economies and Quarterly Provincial Forecasts: Executive Summary*, July 1985

quarter of the year. Unemployment rates remained disappointingly high in spite of the remarkable performance enjoyed by the economy. Though the rate of price increases fell absolutely, they rose relative to the national average.

Weak consumer expenditure growth, limited gains in export opportunities and moderate business-investment spending form the basis of the 1985-1986 outlook. Little likelihood for continued growth impetus provided by offshore oil and gas activity will lead to a sharp decline in growth for the economy over the forecast period.¹⁴ Services industries are expected to sustain 1984 growth rates for 1985 preventing the provincial GDP growth rate from falling below the 2.6% level. The impact of the September closure of heavy water plants in Glace Bay will bring additional lower output to the manufacturing sector and services industries.¹⁵ As a result, further deceleration in economic growth is forecast for 1986 with real GDP increasing by only 1.5%.

Prince Edward Island

The Island enjoyed better than average growth production in 1983, registering an increase of 5.3% over 1982 output levels. This was due to the exceptional year realized by potato farmers and lobster fisherman and by moderate but steady increases in service sector output. However, little improvement was made with respect to unemployment and rates remained marginally higher than national averages. Consumer spending responded to a 14% increase in personal disposable income and played a major role in that province's economy for the latter part of 1983 and 1984. Retail sales rose by 14.6% in 1983 and 11.1% in 1984 led by sales of motor vehicles and other durables. All total, the wholesale and retail trade sector experienced real GDP growth of 8.1% in 1983 and 6.5% in 1984. Housing starts boosted construction activity by over 5% per year over 1983-1984. Other goods-producing industries showed declining growth rates in 1984 which resulted in the services sector, led by the province's best tourist season in three years, carrying the economy to a 3.7% increase in real GDP.

In 1985-1986, consumer spending is expected to lose its recent momentum with retail sales forecast to grow by only 4.4%. Construction activity will be sustained by a mixture of residential building and progress on major projects. Manufacturing production is forecast to fall in 1985, but to enjoy recovery in 1986 with the opening of the new Canada Packer's meat processing plant.¹⁶ The reliance of the province's major sectors on biological and meteorological conditions makes further predictions difficult.¹⁷ Should agriculture and fish production not fair as well in 1985 and 1986, as it did in 1984, service industries will show reduced growth as well. Inflation, lead by

higher food prices, would also be expected to increase. The trend for the P.E.I. economy points to a decline in growth rates to 1.4% and 1.3% for 1985 and 1986, respectively. Employment growth of 6.8% in 1985 will help to reduce the unemployment rate to the 11.6% level in 1986.

Newfoundland

The Newfoundland economy was hit harder than most other provinces by the 1981-1982 recession and, despite increases in real growth, has yet to fully recover. The economy depends, to a large extent, on its three major export-oriented resource industries. Mining was the star performer over the 1983-1984 period increasing output at over 17% per year. Forestry also showed signs of recovery, albeit, at a slower pace. However, the fisheries sector continued to face substantial problems such as high prices, high inventories, and in the last six months of 1984, a trawlerman's strike. The province's relatively higher dependence on non-U.S. markets for its exports also tended to impede production in certain sectors as U.S. demand was considerably stronger than that of most other countries. Compounding the problem were declines in manufacturing and construction. Not suprisingly, unemployment rates reached crisis proportions soaring to over 20% in 1984. This served to dampen consumer demand and, therefore, growth in the commercial services industries. Based on rising energy costs and food prices the rate of increase in the CPI also continued to remain above national average rates.

The situation is not expected to improve in the short-term. Growth is forecast to decline from 3.6% in 1984 to 1.3% in 1985. Despite the ending of the six-month trawlerman's strike in January, the fisheries sector still faces substantial difficulties. Any gains that are realized will likely be offset by predicted lower levels of iron or output and construction activity. This has further undesirable repercussions on the consumer services industries.

The recent signing of the Atlantic Accord will give the province the ability to tax offshore oil and gas reserves as if they were on land.¹⁹ Development of these reserves would lead to increased activity in several of the provinces industries in 1986. Improvements in construction activity will offset problems encountered by the services sector in 1986. Retail trade and other consumer services industries will be affected by slowdowns in personal disposable income growth and consumer spending and, the economy is expected to sustain 1985 growth rates in 1986.

GRAPH IV

PERSONAL DISPOSABLE INCOME AND RETAIL GROWTH (PERCENTAGE CHANGE)

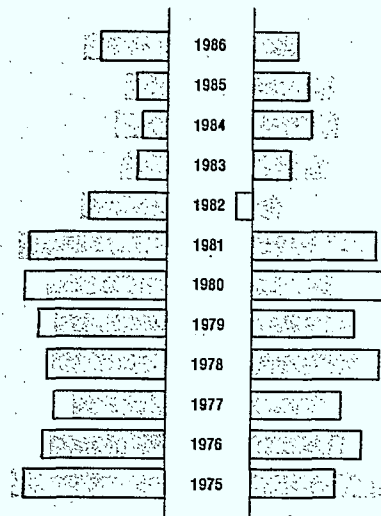
BRITISH COLUMBIA

ALBERTA

SASKATCHEWAN

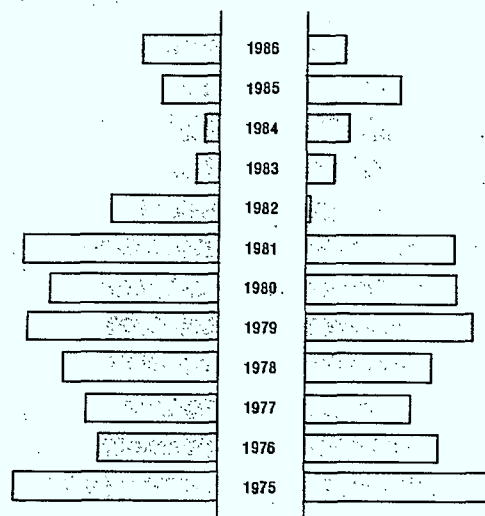
Personal Disposable Income Growth

Retail Sales Growth



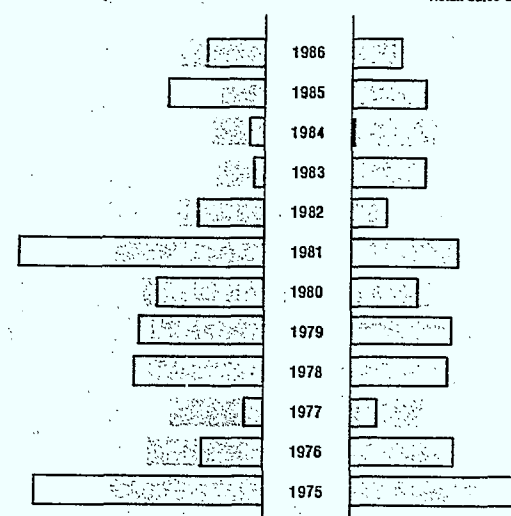
Personal Disposable Income Growth

Retail Sales Growth



Personal Disposable Income Growth

Retail Sales Growth



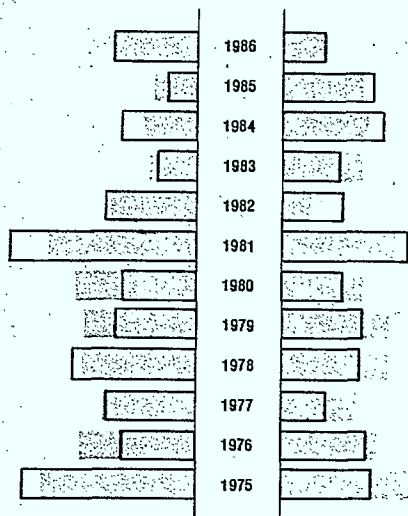
MANITOBA

ONTARIO

QUEBEC

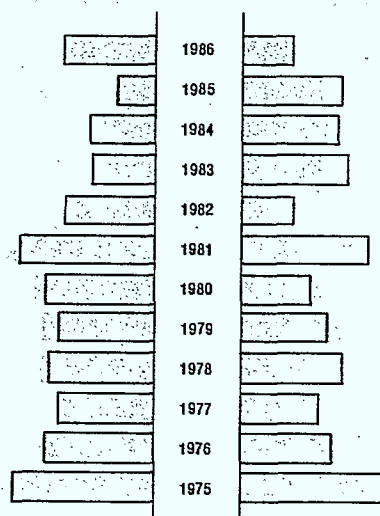
Personal Disposable Income Growth

Retail Sales Growth



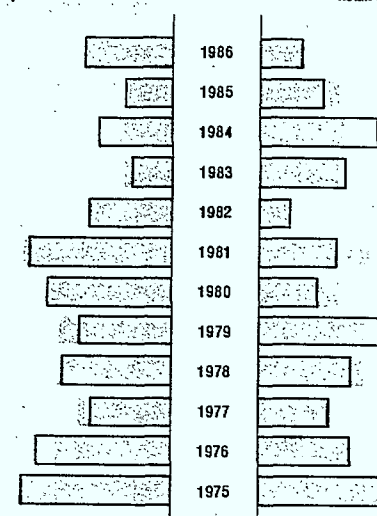
Personal Disposable Income Growth

Retail Sales Growth

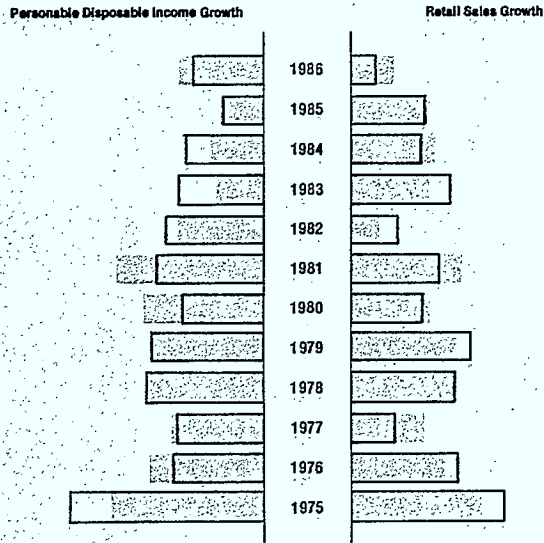


Personal Disposable Income Growth

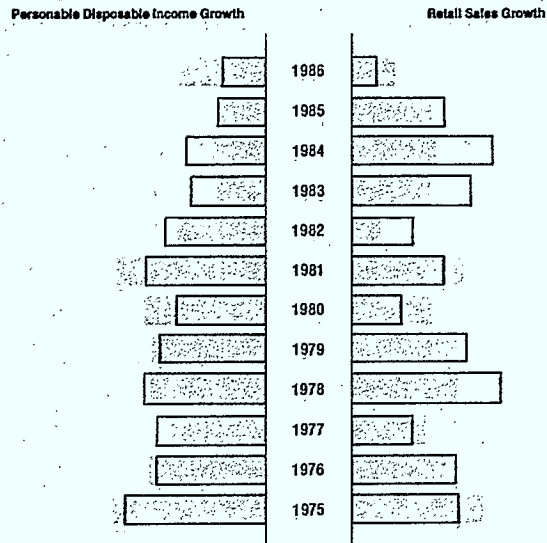
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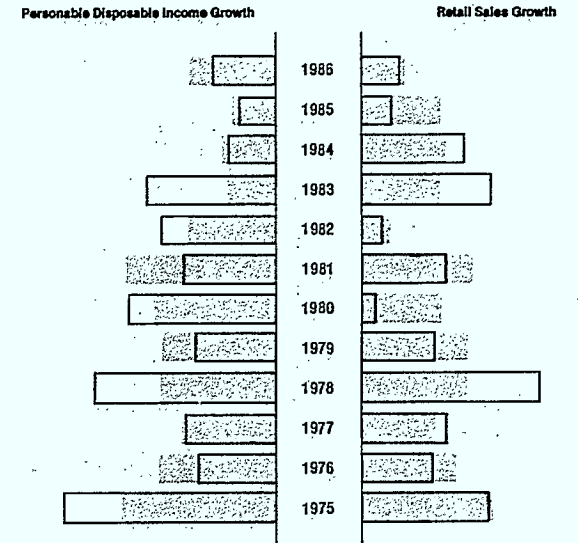
NEW BRUNSWICK



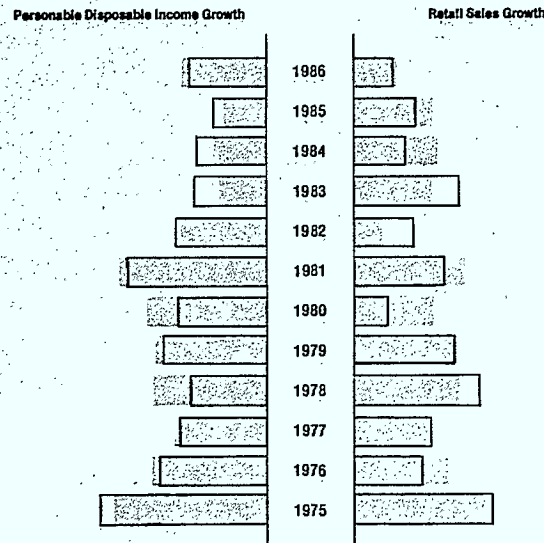
NOVA SCOTIA



PRINCE EDWARD ISLAND



NEWFOUNDLAND

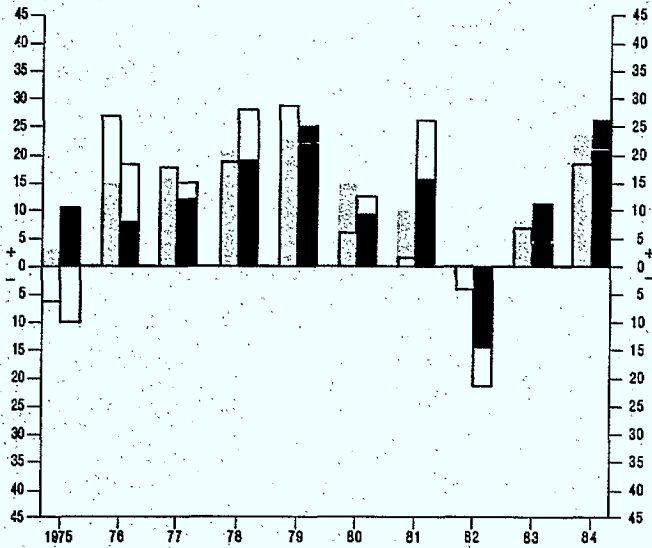


Source: Conference Board of Canada. *The Provincial Economies and Quarterly Provincial Forecasts: Executive Summary*, July 1985

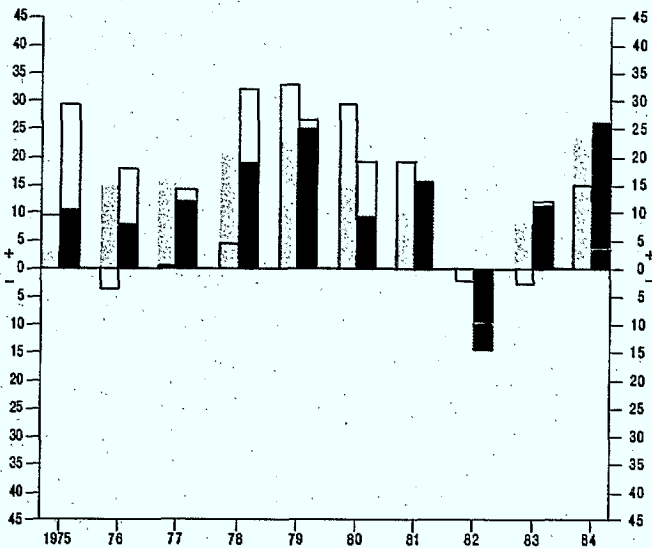
GRAPH V

DOMESTIC IMPORT AND EXPORT GROWTH (PERCENTAGE CHANGE)

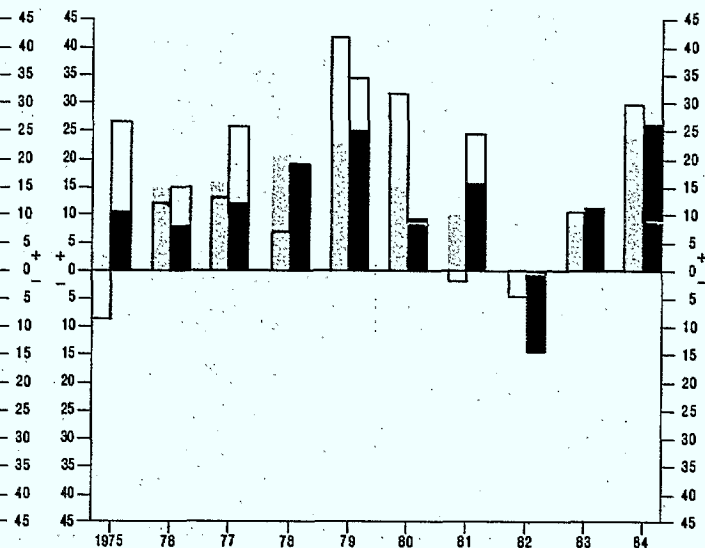
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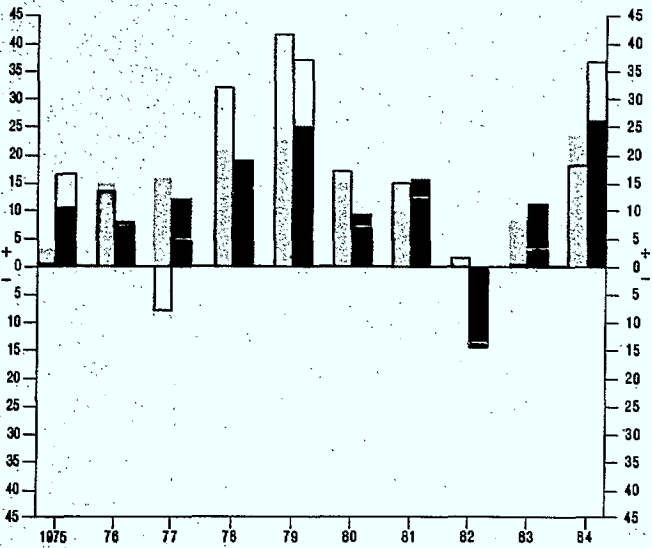
ALBERTA



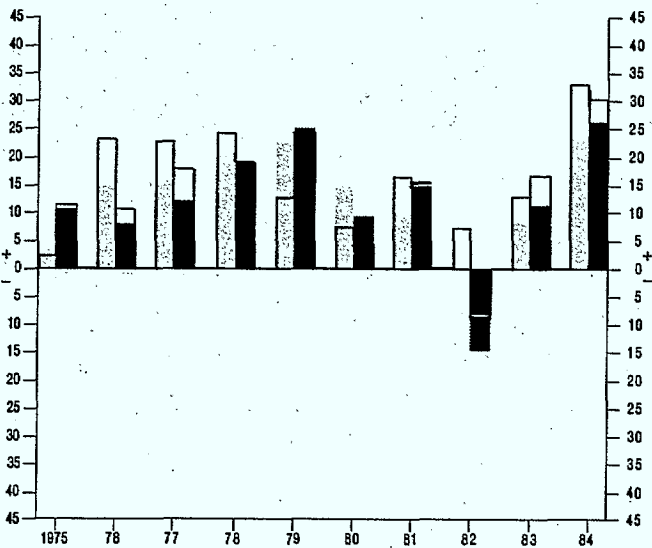
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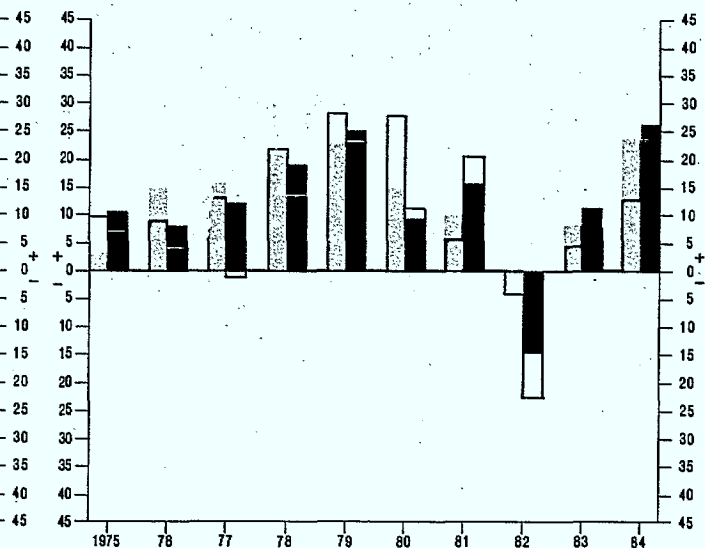
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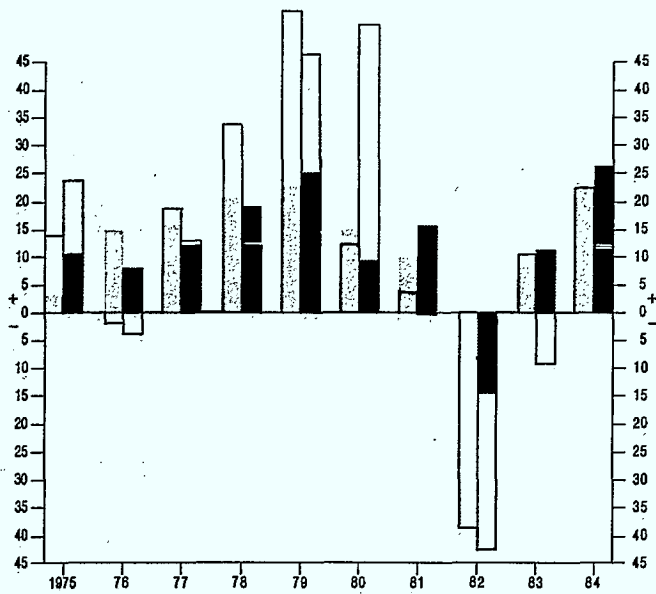
ONTARIO



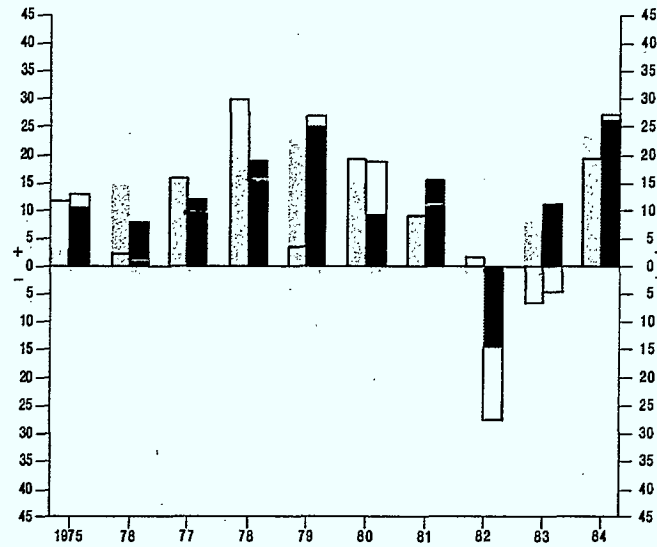
QUEBEC



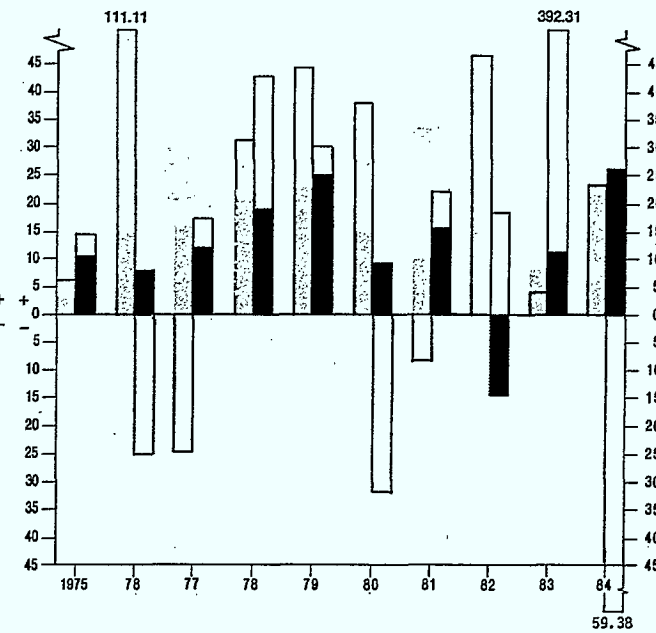
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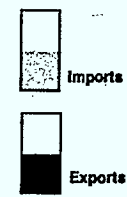
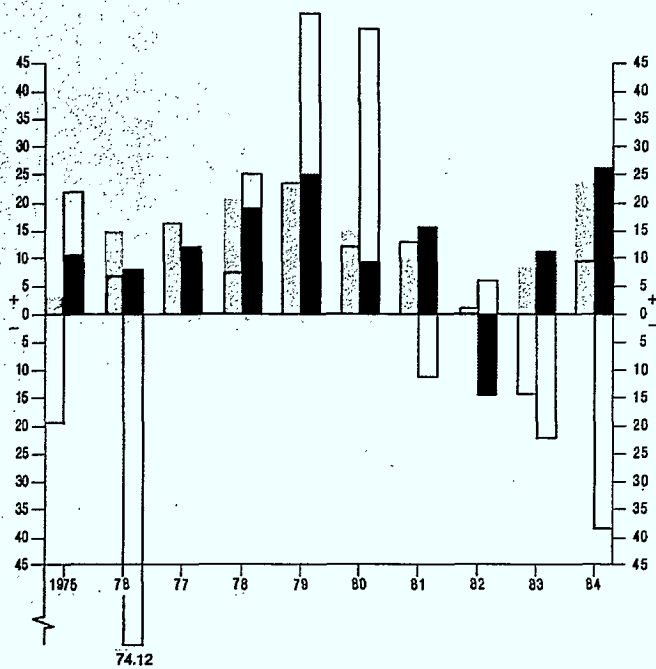
NOVA SCOTIA



PRINCE EDWARD ISLAND



NEWFOUNDLAND



Source: Statistics Canada. Summary of External Trade Cat. 65-001.

FOOTNOTES

1. Dept. of Finance, Canada's Economic Prospects 1985-1990, May 1985, p. 5.
2. Ibid., pp. 11-13.
3. Conference Board of Canada, Quarterly Canadian Forecast: Executive Summary, July 1985, p. 1.
4. Dept. of Finance, Canada's Economic Prospects 1985-1990, May 1985, p. 9.
5. See Dept. of Finance, Canada's Economic Prospects 1985-1990, May 1985, p. 19. Conference Board of Canada, Quarterly Canadian Forecast: Executive Summary, July 1985, p. 1.
6. Conference Board of Canada, Quarterly Provincial Forecast (QPF), February 1985, Vol. 9, No. 3, p. 35.
7. Conference Board of Canada, The Provincial Economies, July 1985, Table 7.1.
8. Conference Board of Canada, QPF, February 1985, Vol. 9, No. 3, p. 30 and The Provincial Economies, December 19, 1984, Table 25.2.
9. Conference Board of Canada, QPF, February 1985, Vol. 9, No. 3, p. 29.
10. Conference Board of Canada, QPF: Executive Summary, July 1985, p. 3.
11. Conference Board of Canada, QPF, February 1985, Vol. 9, No. 3, p. 26.
12. Conference Board of Canada, QPF, February 1984, Vol. 8, No. 3, p. 40.
13. Conference Board of Canada, QPF: Executive Summary, July 1985, p. 2.
14. Conference Board of Canada, QPF, February 1985, Vol. 9, No. 3, p. 23.
15. Conference Board of Canada, QPF: Executive Summary, July 1985, p. 2.
16. Loc cit.
17. Atlantic Provinces Economic Council, Atlantic Report, Vol. 19, No. 4, December 1984 January 1985.
18. Conference Board of Canada, QPF, February 1985, Vol. 9, No. 3, p. 27.
19. Atlantic Provinces Economic Council, Atlantic Report, Vol. 19, No. 4, December 1984-January 1985, p. 4. Conference Board of Canada, QPF, February 1985, Vol. 9, No. 3, p. 17.

5.0 TECHNOLOGY PROFILE

5.1 Introduction

The purpose of this section is to provide a general statement of the interconnection between communications issues resulting from technological developments and how these emerging technological trends interact with economic, industrial and social forces. The contents are drawn from a paper submitted by the Technology and Policy Assessment Branch to the Deputy Minister in the fall of 1984, entitled: "Implications of New Technologies". The technologies which have been addressed are: coaxial cable, fibre optics, satellite communications, cellular mobile radio, radio microwave, and local area network. More specifically, the paper:

- 1) examines the technologies which have a high-growth potential and could be of strategic importance for Canada's communications industries;
- 2) analyze current and potential applications of the emerging technologies; and
- 3) identify possible resulting policy issues.

5.2 Technology Description and Trends

5.2.1 Coaxial Cable

Over the last 30 years coaxial cable has evolved from a simple means of providing television viewers with distant broadcasting signals, free of interference from weather and atmospheric fluctuations, to a sophisticated electronic delivery system offering an ever-expanding array of services, including home entertainment, news, and interactive financial transactions. All cable systems have three basic features: the headend, the cable network, and the subscriber terminal.

The headend is the nerve centre of a cable system. It consists of a number of aerials and other devices which receive signals from broadcast TV, satellites, and local production studios. In the case of broadcast TV, the headend receives the signals from a master antenna, usually erected on a tall building or a high mountain to avoid interference.

The headend is often located near the master antenna. It is the cable master control centre which electronically switches and converts the received signals fro coaxial distribution. Each signal represents a channel of programs. By increasing the number

of receivers at the headend, a cable operator can offer the subscriber more channels. The channel capacity of a cable system also depends on the type of cable used but it can potentially be very large.

Most cable systems permit the subscriber to receive only incoming signals, that is, they are one-way communications systems like broadcast television. Some of the newer systems, however, are "interactive", permitting two-way communications between the subscriber and the headend and, through the latter, between subscribers.

The second feature of a cable system is the cable itself. It is a wire which carries the signals from the headend to the subscriber's terminal. It is either buried underground, ducted or strung overhead. The network can be constructed of coaxial or optical fibre cable, or a combination of both. In the present paper only coaxial cable is discussed. A coaxial cable consists of two conductors sharing the same axis. One conductor is a single-stranded wire; the other is a web of smaller wires woven into a plastic or foam spacer. The coaxial or shared axis configuration allows cable to carry more frequencies than either conductor could carry in isolation.

Coaxial cable is available in several sizes to accommodate various construction applications. The trunk cable is the primary feed line and varies in diameter from 0.5 inch to 1.25 inches. When long distances of cable must be installed, trunk with larger diameter is used because it is less vulnerable to frequency attenuation over longer distances.

Feeder cable is coupled to the trunk cable and serves the franchised subscriber area. The trunk cable may be situated along, say, a major city arterial road while the feeder cable taps off the trunk and serves individual streets. The average size of a feeder cable is 0.412 inch in diameter. A bridging amplifier connects the trunk to the feeder cable. A subscriber's television receiver is connected to the feeder cable by a drop cable which is approximately 0.250 - 0.330 inch in diameter.

Television systems in North America usually require 6 MHz of spectrum frequencies to accommodate both the video and audio portions of a signal or channel. Within this bandwidth, 4 MHz are utilized for video information; the balance synchronizes and stabilizes the video signal. Most coaxial cables are limited to a bandwidth of 300 MHz and equipped with amplifiers that boost the signal through the length of the cable, causing some degradation in signal quality. Theoretically, a 300 MHz bandwidth can support 50 channels (50 x 6 MHz per video channel = 300 MHz); however, interference between channels limits the actual number of 25-35 channels for each coaxial cable.

The third feature of a cable system is the subscriber terminal. This is usually a small switch which connects the TV set to the cable.

Since its invention over 30 years ago, the basic cable technology has gone through some important innovations such as a microwave transmission, tunable converters, digital transmission, and interactive cable. These innovations are discussed below.

Television signals travelling long distances on cable have a greater tendency to attenuate. Consequently, most cable operators attempt to avoid lengthy cable runs. One alternative to overcome this problem is to use microwave or over-the-air transmission. In this case, the signal, which may be from a distant station, is relayed and amplified by strategically placed microwave facilities. When the microwave signal is received by the cable system's master antenna and channelled to the headend it must be demodulated or separated from the microwave carrier. This signal, along with other signals which may be generated or received by the cable system, is then combined with a carrier frequency to match a standard VHF channel assignment on the subscriber's tuner.

One method of increasing the number of channels designated to a cable system beyond 25-35 is to utilize more than one cable. This method, however, can be a costly venture. The most popular technique for expanding cable channel capacity is attaching a converter to the subscriber's set. A converter has two purposes: to translate non-standard frequencies to a VHF channel for direct subscriber tuning and extend the channel capacity of the cable.

Once a converter is attached to the subscriber's television receiver, the receiver is set to an unused broadcast channel, and the converter translates all incoming frequencies to the bandwidth on that channel. All subsequent channel selection and tuning is now done on the subscriber's converter which has a greater VHF channel capacity than the television-equipped tuner.

A converter can also process extra cable channels at frequencies between channel 6 and 7 (midband) and above channel 13 (superband). Thus, including VHF, midband, and superband channels, converter cable channel capacity ranges between 25 and 30 video channels. At the present time cable systems offering many more channels (in some cases over 100) have been developed.

Interactive cable, or two-way communications, is achieved by dividing the single coaxial cable into designated frequencies for downstream and upstream carriage. Because of the inherent bidirectional nature of coaxial cable, processing interactive data offers no insurmountable technical problems. Most often the sub-VHF bandwidth, below channel 2 (54 MHz), is designated for

upstream (subscriber to headend) signals, the 54-300 MHz bandwidth is reserved for downstream (headend to subscriber) transmissions. This technique, known as the subsplit or low-split technique, limits upstream transmissions to a 25-MHz bandwidth, equivalent to 4 standard television channels. Normally, television signals are transmitted in an analog form. That is, variations in electric current are used to assemble video images. In digital transmission, the analog signal is broken down into sets of binary code numbers (0,1) corresponding to each element of the video picture. Once the image has broken down into a digital code, it can be stored and reconstructed into a conventional signal at any time. Digital transmission is superior to analog transmission because greater amounts of information can be stored in small and less expensive memory areas and transmitted through the same cable. Moreover, digital transmission is more efficient because it works only with code numbers, not with an actual signal, and can thus produce superior images.

Digital transmission can be incorporated into any two-way interactive cable system. In this case each subscriber is equipped with a two-way terminal attached to the cable and the receiver. The terminal stores any return messages generated by the subscriber and releases the information when it is "polled" by the central computer of the cable system. Coded digital addresses are assigned to each subscriber terminal for polling by the computer. After accumulating the data the computer either sends the information to an appropriate user or stores it for later processing. Using a console with numerically assigned buttons, the subscriber can respond to material seen on the television screen. All subscriber information is digitalized, permitting messages from numerous subscribers to be packed into a single data stream for transmission and decoding. Thus, a vast array of services, from shopping to opinion poll, become available to every cable subscriber.

5.2.2 Fibre Optics

Fibre optics is a technology developed for the transmission of information through optical fibre. In this technology, the information to be conveyed activates a light source to produce an optical signal, which is transmitted over a hair-thin glass or silica fibre; the optical signal is detected by a device called semi-conductor photodiode at the other end of the fibre to produce an electrical current corresponding to the input signal. The optical fibre guides light by means of reflection that occurs at the boundary of glasses of different refractive index.

A fibre optics system consists of the following principal components: source, source-fibre coupler, optical fibre,

repeater, fibre-detector coupler, detector, and amplifier and sharper-decoder.

The source or transmitter converts the electrical signal into a corresponding optical signal. An efficient source in a fibre optic system must satisfy the following criteria: accurate reproduction of the original electrical signal, high optical output at low current density, low emitting area, high-frequency response, and long lifetime even with current density.

The purpose of this device is to efficiently introduce the optical power into the optical fibre. Its main requirements are a low coupling cost and a perfect match of source and fibre cross-sectional area.

The optical fibre transmits the optical signal from the source (transmitter) to the detector (receiver), either over a single fibre or over a fibre bundle consisting of either a few or up to several thousand individual fibres which can carry the same or different information. Principal requirements of optical fibre include low loss of power and low dispersion of density of the transmitted signal.

The optical fibre has two concentric layers. In the centre is the highly transparent core of very pure glass which carries the light signal and around this is the optical cladding of slightly lower refractive index which repeatedly reflects it. Optical fibre may be classified according to its refractive index profile into two types: step index-multimode or monomode and graded index-multimode.

In the step index multimode fibre there are several hundred different paths that rays of light may take in travelling from one end of the fibre to the other. The transmission times along the paths are different so that a light source spreads out as it travels. This leads to successive signals overlapping and dispersing. Step index monomode fibre solves the problem by reducing the core so there is only one path along the fibre so that for most practical purposes light signals do not broaden as they are transmitted along the fibre.

Graded index fibre was developed to equalize the transmission times of the various paths so that signals transmitted along the various paths arrive at the receiving end in a predictable way.

Depending on the fibre, source, detector characteristics and the total system length, it may be necessary to regenerate the optical signal either electrically or optically by use of repeaters.

The repeater acts as a regenerative system element. It is designed to enhance the density of the signal degraded during transmission over the fibre. It consists mainly of a photodetector which amplifies and reshapes the transmitted signal.

The purpose of this coupler is to efficiently guide the optical signals from the fibre to the detector. It is designed to provide a match of the emitting cross-sectional area and to minimize reflective losses at the fibre-detector interface.

The detector or receiver of the fibre optic system consists of a photodetector which is designed to follow the signal emerging from the fibre in both amplitudes and frequency.

The amplifier enhances the electrical signal generated by the detector in the optical-electrical conversion process and increases it to a level at which it can be reshaped for proper future use. The signal shaper-decoder converts the raw electrical signal emitted from the amplifier into the proper form for use. Its design is a function of the intended applications.

The technical development of fibre optics can be divided into first, second and third generation.

First-Generation systems are, broadly speaking, the systems installed during the 1975-1983 period. They are systems developed mainly for field trials in a variety of environments and for operation under a number of conditions. They served to demonstrate and verify manufacturing and installation techniques, and standards as well as equipment reliability and lifetime. Applications have been made in video, voice, and data transmission, in equipment such as automobiles, airplanes and ships, and in industrial installations, such as high-voltage generating plants and industrial sites.

Second-Generation systems, expected to dominate the 1983-1990 period, are characterized by partial system integration whereby amplification and signal processing will be performed at optical frequencies. The integration will include optical repeaters. Furthermore, such systems will allow a substantial increase in system bandwidth by circumventing the problems of electronic circuit response time that limit the first-generating systems. The integration of integrated optical components will improve the capabilities of monomode fibres. Optical repeater designs will become simpler than designs of hybrid electronic-optic conversion. Furthermore, it is expected that power consumption will be reduced and reliability improved.

It is expected that the 1990's will see fully integrated optic systems (third-generation) in which electronic-optic and optic-electronic conversion elements are totally absent. Examples

of the applications of third-generation fibre optic systems via acousto-optical devices and TV cameras that will be able to form an optical image which can be optically scanned, serialized, and then multiplexed for transmission via optical fibre systems.

5.2.3 Radio Microwave

Radio microwave is a mature technology but recent component developments could lead to more advanced communications services in the home and office. While long distance telephone trunking will remain the major application of radio microwave, technological developments are facilitating its use in small-scale dedicated networks as a result of:

1) Gallium arsenide (GaAs) solid state microwave amplifiers and signal sources which enable more rapid switching, are more suitable for operation at microwave frequencies, have much lower power dissipation and are immune to radiation. Gallium arsenide field effect transistors (GaAs FET'S) are rapidly replacing klystrons and travelling wave tubes as microwave signal sources. Although GaAs FET's have mostly been used as discrete components small scale integrated circuits, monolithic microwave integrated circuits (MMIC'S) are now becoming available. The use of solid state devices in microwave radio equipment has lowered power requirements, improved reliability, simplified installation and reduced maintenance requirements.

2) Trends towards digital microwave systems are due to an increased volume of information suitable for digital transmission, transmission efficiency and cost reductions compared to analog and efficiency of storage, conversion and information processing of digital signals. The relative ease of implementing broadband links between two points will facilitate implementation of small scale dedicated networks, using this technology.

5.2.4 Satellite Communication

Since the gestation period of satellite systems is relatively long - eight to nine years - technological advances in satellite systems which will be launched in the 1990's are being specified this decade and consequently, their characteristics will be well defined far prior to the provision of operational services.

Emerging technological trends include:

Smaller, less expensive receive and transmit earth stations with capacities suitable for individual consumers, as well as business enterprises.

The transition to digital transmission for a variety of signals - voice, image, facsimile, low speed, high speed data, etc., - will result in a much greater multiplexing and interfacing flexibility. This in turn, would permit a much greater interconnection of networks of earth stations.

Improved modulation techniques realized by competing methodologies will result in many fold increases of transponder capacity and corresponding decreases in per circuit costs. These would lead to greater proliferation of small earth stations which could be used for a range of medium capacity services.

Digital sound techniques will revolutionize the quality of sound transmission. Since it would be very difficult to quickly upgrade terrestrial systems to distribute these signals, wide area satellite delivery could become the main broadcasting medium.

Satellite systems can rapidly accommodate developments for the transmission of television signals with improved fidelity (MAC), greatly enhanced fidelity (EDTV, HDTV), greatly improved digital sound and a wide variety of customer services (e.g., program schedule, teletext, news and weather, special interest data services, etc.). The complexity of accommodating such a variety of new applications on terrestrial networks will likely result in a continuing shift to satellite systems with major improvements in the quality of transmission and flexibility in the delivery of programming.

Some form of direct-to-home sound and television broadcasting services will probably evolve, perhaps in cooperation with the cable industry.

The development of video signal scramblers and addressable decoders will permit the introduction of narrowcasting services to reach special interest groups.

Improved launch capabilities will probably reduce transponder costs and improvements and optimizations will likely be made in coverage areas and delivered EIRP.

Crowding of the C and Ku orbital bands will ultimately result in the use of the Ka EHF band which would double the available capacity and would be suitable for the delivery of digital signals in spot beams concentrated on metropolitan centres.

The probable introduction of mobile satellites in the next decade could extend cellular radio services to rural areas providing greater capability and flexibility to reach mobile users.

Eventually, special purpose digital services transponders will be introduced through developments of on-board signal processing technologies which would increase the efficiency and flexibility of transponders useage.

The eventual development of intersatellite links will increase access to satellite signals and flexibility of signal delivery over inter-continental territories.

5.2.5 Cellular Mobile Radio

In the late 1960's work began in the Bell Laboratories in the United States to develop what has become the cellular radio system which can increase the use of mobile radio in urban regions. The concept involves the division of regions which would normally be served by one transmitter into a number of cells. As a result, the same frequencies can be used in more than one cell at a time. The cell diameter can vary from 1.5 to 15 km and the system enables the use of 660 frequencies within one region compared to a traditional mobile radio system which only provides 25 channels. It is no wonder that cellular mobile radio is currently creating a revolution in the provision of mobile radio telephony.

Over the same decade, private land mobile radio systems has experienced an annual growth of more than 15% and paging has had an even higher annual growth rate of 20% to 30%. Equipment manufacturing industries have grown in step - CGE, Motorola Canada, Glenayre and Mobile Data International, to name a few prominent firms in Canada. While most users of land mobile radio may perhaps continue to use private rather than public cellular systems over the next few years, this balance is expected to shift. Attention may also begin to focus on MSAT and possibly SHARP and its variants, over this same period of time.

The evolution of these mobile technologies is bringing significant advances in two area - costs reductions and improved quality of service. The impact of such advances could mean that cellular radio-telephone and its variants would become the universal communications system of the future both in the geographic sense and the range of user groups. Its impact could be similar to that of the "universal" telephone.

The high penetration of cellular radio is predicated on its quality and cost. Initial equipment costs were originally

envisaged to be \$3,000 (U.S.) or \$250 monthly lease. Today, three years from the start of service in the United States the equipment price is \$1595 (U.S.) or \$125 monthly lease. This might well come down to approximately \$500 (U.S.) by 1990.

5.2.6 Local Area Networks

Local area network may be defined as "a communications network that provides for the interconnection of a variety of data communicating devices within a small area." It has three principal characteristics:

- i. Its components, data communicating devices, including any device that constitutes a transmission medium: computers, terminals, peripheral devices, sensors, telephones, and television transmitters and receivers.
- ii. The geographical scope of a local area network is small. The most common case is a network confined to a single building. Networks that span several buildings, such as on a college campus, military base, or an industrial complex, are also common.
- iii. Local area network is generally privately-owned rather than being a public or commercially available system.

Local area network technology evolves around three main elements: transmission medium, network topology, and access method. For policy development purposes, transmission medium is by far the most important of these three elements and is therefore discussed at length here.

The transmission medium of a local area network usually consists of twisted pair, coaxial cable, or optical fibre. This is the most cost-effective choice for a single building with low traffic requirements. The speed of transmission is slow, often expressed in thousand bits/second.

Higher performance can best be met by coaxial cable, which provides higher throughput and can support a larger number of devices. Coaxial is the most commonly used transmission medium in the presently available local area networks.

Optical fibres is at the present time most suitable for high speed point-to-point applications for local area networks. Examples of applications of optical fibre include:

- computer-to-computer high speed link;
- link between buildings of an industrial complex;
- communications path between centres at opposite ends of a city.

Fibre optics is still more expensive than twisted pair and coaxial cable in terms of cost per foot of cable and required equipment (transmitter, receiver, connector). As manufacturing and engineering techniques improve, optical fibre may become a viable alternative for all network topologies in the future.

While at the moment coaxial cable is the most popular transmission medium for local area networks it is believed that optical fibre hold great potential for the future as technological difficulties are overcome and costs are reduced. Optical fibre systems are expected to make significant inroads into the market in the 1986-1988 time frame with sales forecast to reach over \$1 billion by 1990.

The other transmission medium which hold promises in future local area networks are FM pocket radio and infrared light.

FM radio is a broadband rather than a directional point-to-point transmission technique. Because it is broadcast, nodes on an FM radio network need not be stationary, and mobile transreceivers can be used. FM pocket radio will be essential for military and other government needs as terminals and computer systems in these cases are mobile or located in vast areas.

In addition to optical fibre, information can be transmitted within a local area network at infrared light frequencies through the atmosphere. Infrared communications applications have primarily been limited to point-to-point line of sight, such as between closely located buildings. The technology is still in its infancy, but broadening of the applicable areas is beginning to take place.

5.3 Applications, Constraints and Opportunities

The applications subsection is divided into two separate and complimentary sections. The first is a discussion of the applications of the specific technologies; the second is a discussion of how these technologies find their applications within the various sectors defined in this report.

5.3.1 Coaxial Cable

Coaxial cable has been widely used, both as a means to satisfy the growing demand for private consumer services and to increase the capability and capacity of public communications systems.

Cable television has the capacity for a large number of channels, whereas both conventional broadcast television and Direct Satellite Broadcasting are constrained to a handful of channels because of the scarcity of spectrum frequencies. Some of the newer cable systems in the U.S., for example, can handle up to 100 channels or more.

Cable produces a television picture of superior quality. The cable protects the signal from interference by the weather and physical obstacles such as mountains and tall buildings. Cable subscribers are therefore able to avoid the irritation of "shadows" and other symptoms of poor reception; the picture they get is usually clearer and more defined than that received from broadcast television.

While the demand for cable services is primarily for entertainment purposes, there is a wide range of non-entertainment uses provided by cable that may prove in the long run to be more important. Two-way cable, for example, will enable subscribers to have access to an efficient and integrated communications system. Although this potential has not been fully developed, the present cable technology allows people to shop, bank, sell, and work using cable. Cable can also be adapted to read utility meters, to operate security and fire-alarm systems, and to provide general information, educational services, and classified advertisements.

In addition to the above customer services, cable technology has also been applied to provide narrow-casting and to complement broadcast television.

Cable can be used to provide only to those who want to subscribe to them in each locality served by the cable system. Together with its capacity for a large number of channels, this gives the subscriber a wide choice and allows special interest programs such as sports, music, educational, news, general information, and multicultural programs to be shown. Cable technology thus enables television both to cater more specifically to the diverse preferences of television viewers and to measure the intensity of their preferences for different services.

In most countries cable began as a relay service for over-the-air broadcasting in areas with poor television reception. It

can bring distant and foreign television programs to the subscriber. It can also be used to build a national distribution network for telecommunications satellites in space and as a general communications system.

As a means of providing consumer services and increasing the capability and capacity of integrated public communications systems, coaxial cable at the present time is faced with a wide range of competing technologies including the telephone, Satellite Master Antenna Television (SMAT), Direct Broadcast Satellite (DBS), teletext, Multipoint Distribution Service (MDS), Subscription Television (STV), and Low-Power Television (LPTV).

The recently divested local subsidiaries of AT&T already provide information retrieval and the link to household security systems. Plans are underway for development of energy-management, utility meter-reading, and videotex systems. As these companies replace copper telephone lines with higher-capacity fibre optics, they could be provided by a telephone company. The extent to which cable and telephone companies compete in the market place will be determined largely by regulatory and legislative decisions. The telephone companies, with their large assets, long experience, and almost universal penetration, could pose a significant competitive threat to cable.

Satellite Master Antenna Television is a scaled-down version of a cable system. It consists of an earth station designed to receive satellite-distributed signals for re-distribution to the occupants of, say, an apartment building. An SMATV operator negotiates individual contracts to wire each building. The SMATV system typically provides fewer services than a regular cable system--usually programming from some superstations and a few pay-television networks. For the operator, SMATV has the advantage of low start-up costs and few regulatory obligations. For the subscribers, SMATV offers access to a limited number of cable services where conventional cable systems have not been installed.

In an effort to reduce the price of household earth stations and therefore promote their use by consumers, some initiatives have been undertaken in the U.S. to increase the transmitting power of satellites. Essentially, this can be achieved by:

- increasing the size of the transmitter, or
- increasing the bandwidth of the channel transmitted, or
- focussing the energy of the transmitter on a narrow geographical area.

While increasing the size of the satellite transmitter is expensive due to very high launching costs, increasing the channel bandwidth reduces the number of channels that can be transmitted, and focussing a beam on a small geographical area present several technological obstacles. The relatively high cost of DBS is expected, however, to limit the market to areas in which cable television is not available.

The broadcast version of videotex is teletext. Broadcast stations can include data or the vertical blanking interval of the broadcast signal that is not used to transmit images. Subscribers must have the equipment needed to separate the teletext information from the rest of the broadcast signal. The disadvantage of teletext is that it allows for only one-way transmission of data and at a considerably slower speed than videotex. Though adequate for the distribution of news or advertisements, teletext could not accommodate information retrieval.

An MDS microwave system uses a fixed, omnidirectional transmitter operating in the 2,150 - to 2,160 MHz portion of the electromagnetic spectrum. Thus MDS operates as a closed-circuit microwave transmission system. Little use was made of MDS until 1970, when the allocated bandwidth was widened to allow for transmission of color-television signals in a given area. The usual range of an MDS system is twenty-five to thirty miles.

MDS has been used by SMATV operators to link several buildings in a network with an individual earth station. Hotels represent a large part of the market for this application. Cable operators sometimes use MDS to link individual cable systems or to link receiving antennae with a cable headend. A technical drawback to using MDS is that microwaves require line-of-sight transmission path. Buildings and trees deflect the microwave signal. As a result, many of the households in a given area cannot receive MDS programming.

Unlike microwave-based broadcasting systems, STV relies on the standard VHF or UHF television signal to distribute programs in a local market. The STV operator, who usually receives programs from a pay-television network via satellite, broadcasts a local television signal that has been scrambled by an encoding device. The advantage of STV over MDS is that a special microwave antenna is not required for reception; all television sets in the local market receive the scrambled STV signal. The STV operator provides each pay-television subscriber with the decoding device required to interpret the scrambled STV signal.

Historically, STV has not done well when introduced in the areas where cable is not available. In areas where no cable is available, STV market penetration is about 10%. It is widely expected that STV will not pose any significant threat to cable.

A LPTV system broadcasts with less power than a conventional television station. It serves a smaller market area, usually within a fifty-mile radius. Conventional television stations broadcast over a much larger area, up to 70 miles in radius. The advantages of an LPTV system include lower start-up costs and fewer regulatory constraints than for a conventional broadcasting system.

Both cable and broadcast television face potential competition from home video equipment. Two distinct types of technology are involved: videotape and videodisc. The technology of videotape is essentially the same as that of audio recording. Electric current is used to align molecules of a magnetic coating on a strip of plastic tape. A video player machine may be used only to play prerecorded tapes; it cannot record. The video player can both play and record tapes. Usually, the household use of a video recorder is to store programs distributed through retail stores and through direct mail order.

5.3.2 Fibre Optics

Optical-fibre systems offer many advantages compared with conventional copper-cable systems in that they greatly assist in producing substantial economies compared with twisted pair or coaxial cable systems as indicated below:

Advantages

- low signal lost per unit length resulting in longer distances between repeaters, hence fewer repeater and improved system reliability;
- very large information transmitting capability;
- small, light, and flexible cables leading to easier installation and a better utilisation of duct space;
- potential for reduced cable cost because the basic material, silica, is in plentiful supply and very little is required to produce fibres;
- reduced equipment costs;
- complete electrical isolation and improved security;
- high immunity to interference.

Due to the obvious advantages that optical fibre has over copper wire in terms of bandwidth, size, weight, noise, and inter-

ference immunity, and repeater spacing required for a given level of performance, fibre optic has numerous applications, both in private systems and in public systems.

The applications of fibre optics in this area include:

- access to cable television;
- down-loading of software for personal computers;
- still-picture data: The subscriber to a cable television system can obtain hard copy of information provided by the system;
- checkless, cashless transactions;
- shopping and reservations: keyboard selection by subscriber;
- on-line access to policy and fire protection;
- automatic utility meter reading;
- optically wired recreational boats and automobiles.

The applications of fibre optics in public systems include:

- local area networks;
- fifth-generation computers;
- telecommunications links;
- cable television systems;
- industrial, ship, and aircraft communications system.

The opportunities of fibre optics are numerous but the growth of the fibre optics industry in Canada, however, is constrained by several technical and policy factors.

On the technical side, the following issues still need be resolved:

- requirement for more precise control of fibre production process to obtain better fibre dimensions and index profiles;
- difficulty in joining individual fibre segments;
- limited lifetime of light sources and associated system reliability;

- need for fibre protection in order to allow for rough installation and efficient maintenance.

The difficulties mentioned above are compounded by the general low level of research and development in fibre optics in Canada compared with other countries such as the U.S. and Japan. Except for the major efforts made by Northern Telecom/Bell Northern Research, the National Research Council, and DOC's Communications Research Centre, little work is being carried out in this area elsewhere.

On the policy side, the CRTC's decision to postpone its ruling on the provision of non-programming services until 1985 did not help resolve the industry's concern regarding the uncertainty in the future of fibre optics in Canada.

5.3.3 Radio Microwave

Digital Termination Systems (DTS) using radio microwave can be used to connect localized broadband digital communications networks, such as a Local Area Network (LANs), digital PABXs and Multi-Tenant Telecom Systems. With data rates of up to 1.544 Mbps, the DTS loops are suitable for applications ranging from high speed data distribution and videoconferencing to computer-to-computer communications. Using the cellular radio concept, the range of communications within each cell is 6 to 10 km. This approach permits frequency reuse, and in conjunction with satellite links or terrestrial microwave radio, can provide end-to-end communications services with bandwidth from 1.2 kbps to 1.544 Mbps to each user station.

Together with the growing need to interconnect sophisticated localized digital communications systems, there is an increasing need to provide intracity interconnection of LANs and PABXs and to provide communications links to gateways which will allow intercity traffic. As a result of bandwidth and quality limitations of twisted pairs and the expense and time involved in upgrading cable facilities, there is an emerging trend to use radio microwave.

Another application of microwave technology to meet communications needs in the home environment is the Multipoint Distribution System (MDS) which is rapidly taking its place alongside cable and satellite television services, particularly as an economical method of distributing television signals in remote and rural communities. MDS uses omnidirectional microwave broadcast antennae to provide TV service to subscribers with a 25 mile radius. The omnipattern can be modified by using a cardioid transmit antenna to avoid interference or to optimize coverage of the service area. Receiving site use highly directional antennae

fitted with a downconverter which converts MDS frequencies to VHF-TV or CATV channel frequencies.

Although the predominant application has been for TV distribution, MDS could also be used for telecommunications services such as data distribution, facsimile and teletext services. The economy of using MDS would also allow it to be used as privately owned and operated communications networks.

DTS, whether provided by public or private organizations, could meet emerging communications demands for localized, intracity and intercity digital interconnection capabilities and provide for economies of scale through facilities' sharing and required periodic upgrading. In addition to satisfying specialized growing market requirements, there would be obvious industrial benefits, if Canadian equipment manufacturers and suppliers could secure domestic and international market niches for its technological components.

Although MDS services are very similar to those provided by cable, MDS has advantages over cable. MDS is not as capital intensive as cable, where communities must first be wired. With MDS, a transmitter can serve homes within a 25 mile radius with no investment other than individual receiving equipment. However, MDS does present technical problems such as the necessary line-of-sight path, and absence of signal security. In spite of these constraints, it is likely that MDS could compete with cable TV services in partially wired markets at first and ultimately in high cable penetration areas.

5.3.4 Satellite Communications

While fibre optic cable and digital microwave links might best serve point-to-point trunk services, the major rapid development, wide area coverage and distance insensitivity characteristics of satellite will determine its potential long term applications. Continued and increased use of satellite systems is anticipated for the following types of applications:

- 1) National and international distribution of television and sound broadcast signals.
- 2) Wide area access features and reduced cost of uplink earth stations and introduction of television bandwidth compression techniques will increase the availability of teleconferencing networks for distance education, telemedicine and other business applications.

- 3) Reduction in earth station costs and advances in speech processing techniques will probably result in satellite useage for telephone service to rural and remote area.
- 4) Data broadcast is the most rapidly growing service area which will probably see increased use of satellites with the availability of low cost terminals, advanced transmission technology and digitization. These services could be delivered to business and home consumers.
- 5) Technological advances and decreased earth station cost will enable businesses to access data banks and transfer data to central or other locations at low or high data rates, resulting in various forms of data networks.

Canada's geographic, climatic and demographic situation led it to an early adoption of satellite technology. A pioneer in this area Canada has the expertise and industry capability to benefit from satellite communications advances both to serve its own needs and to market its products and services abroad. Trends towards digitalization, increased transmission flexibility and capacity and reduction in earth station costs represent significant opportunities for not only the established telecommunications industry but also varying sizes of business entrepreneurs, and individual consumers through, the establishment of private business networks, and a variety of other broadcasting applications, such as narrowcasting.

5.3.5 Cellular Mobile Radio

The development of technical capabilities mentioned above, together with a rapidly broadening market base, will lead to the possibility and probable demand for new services such as:

- Dispatch (voice and digital)
- Paging on cellular (one system per car/person instead of two)
- Data base access from mobiles
- Narrowcasting (voice or data selected groups, e.g., company staff)
- In building cellular
- Voice privacy
- Vehicle individual tracking
- Medical linkage to personal bio-systems (monitoring, control of emergencies, etc.)
- Complete mobile office service
- Personal Emergency Locator Systems

In Canada cellular mobile telephony services will, at least initially, be provided on a competitive basis by telephone companies and Cantel in 23 metropolitan areas. Although there is

little market data available for cellular mobile radio systems in Canada, license applications received by the Department would seem to indicate that there could be some 15,000 subscribers in the first year of operations; generating \$27 million of revenue. In the fifth year, some 75,000 subscribers are estimated to generate revenues of \$135 million. Since Canada has the same equipment standards as the United States, the opportunity for a number of Canadian equipment manufacturers such as Northern Telecom, Novatel, and Glenayre, expands significantly if they were to capture a share of the U.S. market.

Cellular mobile radio services also present opportunities for content and software development which will be required as the applications of the systems increase and the demand for a variety of services grows.

To date, planning for the introduction of cellular mobile services in Canada has been hampered by the difficulties which Cantel, the national service provider, and the telephone companies are experiencing in reaching agreement on connecting their systems. Any delays in offering the service in Canada will harm the equipment manufacturers potential to penetrate the U.S. market where the service is to begin by the end of 1984.

5.3.6 Local Area Network

The application of local area network technology is a natural logical step in the evolution of information processing technologies. Local area networks will be found wherever there is requirement for information storage, processing, retrieval, and transmission.

The applications of local area networks can be divided into two groups: private and public applications.

The most common private system application of local area networks is associated with the use of personal computers. With the relatively low cost of these machines, more and more people acquire them for personal use. A local area network linking these computers may enable their owners to work together or to share information or software which is too cumbersome and expensive to be loaded on each computer.

The most common public system applications of local area network include the following: personal computers, computer centre networks, general office automation systems, and integrated voice and data local networks.

Similarly to the use of personal computers by independent individuals, the low cost of these computers enables managers within a corporate organization to procure them for stand-alone applications such as spread sheet or project management work. A collection of stand-alone processors, however, will not meet all of an organization's data processing requirements. Some programs are too large to be run on small personal computers and also corporate-wide data require a central storage facility. There is also the requirement to use local area networks to link individual work stations together and with corporate wide systems using gateway facilities.

These networks are referred to as high speed local networks (HSLN). They are often used to link computer centres of large companies or research organizations.

A local area network can be used in a general office automation system to connect not only work stations but also a variety of other devices such as computers with text and data files, facsimile machines, and intelligent copiers.

With the advent of digital voice transmission technology, there now exists the capability to integrate the telephone switching system of an office building with the data processing system, thus providing a single local area network for both voice and data requirements.

Several Canadian firms have been vigorously exploiting the potential of local area network applications in Canada. The activities of these firms are summarized below.

- i. DY-4 Systems Inc. of Ottawa introduced its Dynasty I local area network about two years ago to link its microcomputers. The company recently introduced Dynasty II, a system designed to connect outside IBM personal computers and the company's own machines. The company has sold local area networks to about 40 establishments, including several colleges. Most of the sales have been in Canada.
- ii. Northern Telecom's OPEN (Open Protocol Enhanced Networks) WORLD is a \$1.2 billion program set up to carry out research and development work in information management systems. OPEN WORLD software on Northern Telecom's SL-1 PBX allows it to establish local area networks to link its own products and those produced by IBM and DEC.
- iii. Develcon Electronics LTD. has a product designed to link a variety of products such as microcomputers, terminals, mainframe computers, and microcomputers.

- iv. Net One Data Corp. of Mississauga, Ontario, produces a local area network called Easynet. This system can connect central processing memories (CPMs) such as those produced by Xerox, NCR, Control Data, and others. Easynet can connect up to 255 separate microcomputers.
- v. Crownteck Inc. of Markham, Ontario has a network called Product Net which integrates a local area network for IBM personal computers with the mainframe data processing unit.

As seen above, the opportunities for local area network technology in Canada are numerous. The growth of this technology, is, however, constrained by the ability of the users of this network to get access to both local and long-haul communications systems owned and operated by telephone and cable companies. This issue will likely dominate the regulatory debate in Canada in the next several years.

5.3.7 Telecommunications/Carriage

Voice Telephony

Applications in voice telephony have been centered in three areas: traditional carriage systems, mobile systems, and the provision of telephone services to remote and rural areas.

Traditional carriage systems have largely used cable and radio microwave for transmission. Applications of both technologies are currently being made using digital transmission techniques. Coaxial cable is used in areas where substantial cable networks already exist or are developing for purposes of data and video transmission. A potential application for coaxial cable lies in the area of long distance telephone access. (Current long distance voice transmission is handled effectively by radio microwave.) In addition to inter-city voice traffic, the technology has recently been designed to provide short distance or intra-city private broadband voice and data communication as an alternative to the existing cable plant in cities.

Three predominantly newer carriage systems are based on fibre optics, satellite, and cellular radio technologies. These technologies tend to be more efficient, reliable, and flexible than their predecessors. They also offer integrated voice/data/image transmission. This application will be discussed later in computer/telecommunications convergence under Informatics (number 5.3.9, p. 53).

Optical fibre has made significant inroads in traditional networks and potential applications suggest this will continue. It is increasingly being utilized for heavy volume trunk and

feeder lines, metropolitan inter-exchange trunking, toll connect and inter-toll trunking, large capacity multiplexing and to augment or replace links within the common carrier network.

Potential applications using satellite technology are in long distance trunking and teleconferencing networks point-multi-point distribution. Due to the inherent time delay between sending a signal and receiving it, satellite transmission does not lend itself well to point-to-point voice services. In this respect, film optic technology is more advantageous in areas such as international networks.

In the provision of mobile services, the most recent application has been cellular mobile radio. As of July 1, 1985, cellular mobile radio will be in service in Toronto and Montreal. In addition to providing mobile voice communications, cellular mobile radio can also provide enhanced services such as call-forwarding, voice dispatch, paging, narrowcasting, voice privacy, vehicle individual tracking and personal emergency location systems.

Mobile satellite or MSAT is a proposed system that would provide more effective and reliable communication services via satellite to supplement short-range terrestrial mobile communication systems. These short-range terrestrial systems may be based on the cellular mobile radio concept or may consist of a Multi-Point Distribution System (MDS) using radio microwave. In addition to providing cost effective mobile radio and telephone services to a variety of low-cost mobile terminals MSAT would also provide paging services. Competition for the provision of mobile voice services could also come from specialized mobile radio. Cellular mobile radio does have advantages in terms of frequency re-use and lower power requirements. Closely linked to the provision of mobile voice services is the provision of voice services to remote areas and rural communities. Cellular mobile radio, MSAT and radio microwave all have applications in these areas.

Data Transmission

Five of the six technologies find applications in the area of data transmission which includes messages, teletext, and facsimile.

Coaxial cable has potential applications in two-way interactive data and high speed data transmission. Fibre optic cable is currently providing message services in existing networks and because of its high capacity has potential for use

in wideband data transmission and other non-broadcast communications. Existing cable systems have the capacity to distribute data for institutional and residential use but may face competition from telephone companies who could offer similar services by employing fibre optics in their systems.

Data broadcast is the most rapidly growing service area for satellites. Increased use is expected with the availability of low cost terminals, advanced transmission technology and digitization. However, inherent time delays in transmission means satellite technology does not lend itself to interactive data services. DBS has the potential to provide teletext, facsimile, and narrowcasting for specialized audiences. Satellite systems, in particular MSAT, have applications in the provision of mobile data services. MSAT has the potential to be used for mobile data transmission, data acquisition and control services. Data access from mobiles and data narrowcasting are also possible applications of CMR.

Suitability to high bandwidth communications has made radio microwave function particularly effective in long distance inter-city data transmission. It has further applications in DTS which developed due to limitations of terrestrial voice-grade telephone plant with respect to data transmission. The primary intent of the system is to connect relatively low capacity users to one or more earth stations for long distance data communications. Data speed rates make DTS suitable for a number of applications including high speed data and facsimile distribution, video conferencing, and computer-to-computer communications for bulk data transfer. Using the CMR concept, the ranges between cells is 6-10 km. A portable computer is integrated with CMR allowing access to databases. This approach permits frequency re-use and, in conjunction with satellite links or terrestrial microwave radio, can provide end-to-end communication services with bandwidths from 1.2 Kbps to 1.544 Mbps to each user station. Where upgrading cable systems is becoming too expensive and time consuming, DTS is expected to make significant inroads. DTS is also capable of providing data communication services on a local level.

Radio microwave applied in MDS could also be used for telecommunication services such as data distribution, facsimile and teletext services. The economy of MDS would allow it to be used as privately-owned and operated communications networks. Lower capacity microwave systems at 18 GHz using narrowband channels could be attractive in areas where there is congestion at lower frequencies.

5.3.8 Broadcasting and Cable

In the broadcasting and cable sector there has been an explosion in the use of new technologies to deliver programs. This has been dominated by an expansion in the capacity of cable TV and by the emergence of satellites, satellite networks, DBS home receivers, pay TV and videotex.

The use of coaxial cable for TV is currently where the technology functions most effectively. Unlike conventional broadcast TV and DBS, coaxial cable is not constrained by the scarcity of spectrum frequencies and has the capacity for a large number of channels. Cable also produces a TV picture of superior quality. It can provide narrowcasting, has the potential for two-way transmission and can be used to build a national distribution network to support and complement satellite communications systems. In this sector cable will face competition from SMATV, DBS, MDS, Subscription TV (STV) and fibre optics.

SMATV is a scaled down version of a cable system which provides fewer services but has lower start-up costs and fewer regulatory obligations.

DBS has the potential to compete with cable in areas where the latter is not yet available. DBS may only provide limited competition due to technological obstacles like high launching costs and focussing the beam on a small geographical area. Potential services to be offered via DBS are audio for radio networks, pay TV, advertiser-supported TV and narrowcasting. DBS also has the capability to improve broadcast signals and could figure prominently in the delivery of enhanced definition and high definition television (EDTV and HDTV). However, the current role for DBS is seen as complementary to existing broadcasting delivery systems.

MDS is also rapidly taking its place alongside cable and satellite for the provision of television services. Although economically more suited for the provision of TV services to remote and rural areas, it does find applications elsewhere. For instance, MDS has been used by SMATV operators to link several buildings in a network with an individual earth station. Its application in this area is limited by its line-of-sight transmission path requirements. Subscription TV, although no real threat to cable, does have an advantage over MDS in that a special microwave antenna is not required for reception.

The application of coaxial cable in broadcasting is most threatened by fibre optics. Optical cable is either currently being used or has the potential to be use in areas where coaxial cable has been traditionally used. In applications such as radio and TV, entrance links connecting transmitters and receivers to land networks and in other areas where cable supports or

complements broadcast systems, optical fibre is expected to gradually replace coaxial cable. Optical fibre also has the potential to be used for private system access to cable TV systems and in new program distribution methods for TV.

Satellites are currently used for national and international distribution of TV and sound broadcast signals. Potential applications for satellites for broadcasting purposes will be based upon the technological advantages these systems have in point-to-multipoint transmission capabilities for broadcasting video signals. Remote and rural areas have broadcasting requirements particularly well suited to satellite broadcasting. Satellites will continue to play a prominent role in the provision of broadcasting services to remote areas or countries where a terrestrial infrastructure has yet to be developed or is not feasible. Satellite transmission to program distribution and broadcasting industries has several advantages: uniform, high quality reception; stable transmission as new points are added to the network; and flexibility of adding on networks almost anywhere. Combined with these properties a decline in the price of "receive only" stations has led to a switch to satellite communication systems by cable systems and radio and TV networks.

Potential competition for provision of broadcasting services to remote and rural areas will come from MDS since it is especially economical in this application. Their system uses omni-directional microwave broadcast antennae to provide TV to subscribers within a 25 mile radius. MDS was originally envisioned to be applied in the following five areas:

- entertainment via the distribution of pay TV,
- business communications for training and new product introduction,
- data transmission for high quality,
- medical training, and
- law enforcement.

However, it has only shown any kind of viability with respect to Pay TV distribution.

5.3.9 Informatics

Computer/Telecommunications Convergence

Computer/Telecommunications convergence refers to the merging of what were once the two distinct technologies of informatics and of telecommunications. Rapid developments in both technologies has led to the creation of integrated voice, data and image networks and the provision of enhanced services like electronic mail, voice messaging and data retrieval services.

Due to their large capabilities and potential for two-way interactive transmission, coaxial cable and optical fibre are leading the way in integrated transmission. In the long run, two-way coaxial cable may enable subscribers to access efficient and integrated communication systems offering various services e.g., video conferencing. In urban areas where the increase in office automation, data, and voice communication require large capacity the only alternative will be fibre optic cable. Other applications of fibre optics will be the downloading of software for personal computers and in the design of fifth generation computers. Satellites also have the potential to be used to complement microwave and other terrestrial technologies across land and overseas for voice, video, and some data transmission.

Existing coaxial cable-based systems will also provide enhanced services allowing people to perform a variety of interactive/transactional services using computer/telecommunications technology. Examples include shopping and making hotel reservations, banking, working, automatic utility meters, operating security and fire alarm systems and providing general information and educational services. The conversion to fibre optic cable from copper telephone lines by telephone companies will allow them potential to compete in the provision of enhanced services. Broadcast stations could provide competition as well by including data on the vertical blanking interval of the broadcast signal that is not used to transmit images. However, in the latter only one-way integrated transmission is possible.

Local Area Networks

LANs have been included in informatics primarily because of their integrated transmission properties. This section is divided into the applications of other technologies in LANs and the applications of LANs themselves.

Coaxial cable is currently the most commonly used transmission medium in LANs because it is well-developed, has low cost, is easy to splice, and has fairly high capacity. It is used for wired terminal to computer links. The use of optical fibre in LANs is currently most suitable for high speed point-to-point applications. Although optical fibre is still more expensive than coaxial cable in terms of cost per foot and required equipment, as manufacturing and engineering technology improve it may become a viable alternative for all future network topologies. This is due to the following advantages the technology has in LAN applications: low error rate, higher transmission rate and channel extending/links that allow for "wider" LANs, and more "remote" local terminals.

Part of the cellular strategy includes the design of unwired LANs to be applied in small cell markets such as offices or airports by digitizing and compressing voice requiring less

than 18 KHz bandwidth spacing between voice channels. Radio microwave is also applied in LANs via DTS. DTS can be used to connect localized broadband digital communication networks, including LANs as well as digital PBXs.

LANs have both private and public applications. The most common private application is in personal computer networks. Public system applications include personal computer networks, linking computer centres of large companies via high speed local networks (HSLN), general office automation systems and integrated voice and data local networks. The main advantages of LANs are efficiency and reliability with respect to peripheral linking, large data base access and computer-to-computer communications.

5.4 Policy Issues

5.4.1 Coaxial Cable

Demand for basic cable services and new television services such as Pay TV and tiered services are projected to continue to 1990, but at a declining rate. Expected growth in demand for non-programming services and the integration of data, video, and voice communications are the main opportunities for cable system operators.

Potential competition does exist from DBS and fibre optics. In particular, the capacity superiority of coaxial cable is threatened by fibre optics and, if used by telephone companies, will give them broadband capacity and the ability to compete with cable systems operators. To meet this competition cable systems operators must increase their R&D, capital investment and marketing efforts. To create a favorable environment for such activity will require appropriate regulatory and industrial policies. For example, a decision by the CRTC on the future of non-programming services would eliminate the uncertainty currently facing the industry. Direct and indirect support and assistance by government is deemed necessary for the future success of the cable industry.

As discussed later in section 7.3, the fact that cable has a much higher penetration rate in Canada than that in the U.S. indicates that the Canadian cable industry is thriving. The industry's vigor has undoubtedly been helped by the issuance of the Broadcasting Strategy by the federal government and the CRTC's recent expeditious and liberal decisions on enhanced services. Nevertheless, the cable industry's development could be further enhanced by appropriate regulatory and industrial policies.

As stated in the Broadcasting Strategy, cable has been identified as Canada's chief instrument in the development of the

information society in the country. This includes cable's role both in the strengthening of the Canadian broadcasting services and in the provision of non-programming services. While Canadian cable industry representatives are appreciative of the importance that the federal government attached to the industry and the understanding and cooperation on the part of the CRTC, they are still concerned that the growth of the industry is impeded by the following regulatory obstacles:

- i. The issuance of experimental licences by the CTRC appears to create some uncertainty within the industry. Due to this policy, the industry is forced to invest capital to experiment in a service while being uncertain on a continuing basis.
- ii. The approach of the CRTC to rate regulation is another concern expressed by the industry. The approach of the CRTC in establishing rates, which has never been publicly disclosed by the Commission, appears to be inconsistent to the industry.

Although the Canadian content in cable equipment and services appeared to be over 50% prior to the start-up of pay-TV in early 1983, it may decline in the future due to the competitive efforts of major multinational electronics manufacturers. In order to ensure that Canadian cable industry suppliers have the best opportunity to effectively exploit the international market, industry has suggested the following policies for further exploration:

- i. R&D stimulation through transfer of technology (fibre optics, signal compression techniques, etc.);
- ii. availability of across-the-board R&D and other tax incentive schemes to companies for the research phase of a product;
- iii. design of tax shelter programs to encourage investors to provide start-up venture capital to young and innovative companies for the development of new or enhanced products;
- iv. assistance in the tracking of international markets through focussed government-to-government relations in cable and other equipment areas;
- v. establishment of specific supplier development incentives for the cable industry, either directly or via cable operators;

- vi. regulatory stimulation of marketplace development encouraging the cable industry to advance more quickly into new services;
- vii. the establishment of Canadian industrial benefits as one of the factors to be considered in the licensing process;
- viii. development of cable research in government and laboratories, especially in those areas which may be too costly, despite their potential for Canadian firms.

The cable industry in Canada appears to be healthy at the present time. The development of the industry has been helped in the last few years by the issuance of the Broadcasting Strategy by the federal government and the CRTC decisions on pay-TV and enhanced services. While the advent of home video equipment is seen as a compliment from cable service, coaxial cable will likely face strong competition from telephone companies and DBS service providers. This challenge is by no means detrimental to the Canadian cable industry. On the contrary it may enable the industry to become even more vigorous and competitive.

5.4.2 Fibre Optics

The demand for fibre optics up to the year 2000 is seen to be largely dependent on its reliability rather than bandwidth capacity; the requirement for which is still uncertain. Nevertheless, worldwide growth in demand is expected to exceed \$46 billion by 1989.

Major opportunities will be in the areas of integration of data, video, and voice services and on the replacement of copper based telecommunications systems. The latter is dependent on bandwidth requirements, life of existing plant, and operational costs. Export markets have high potential particularly third world countries where no networks currently exist. However, the lack of technical expertise available to maintain and repair fibre optic systems has restrained the funding of major projects in these areas.

In addition to problems with the technology itself (e.g., splicing) the Canadian communication manufacturing industry is currently plagued by a low level of R&D relative to other countries and by the delay of the CRTC in reaching a decision on the future of non-programming services. To compete vigorously on the world market a decision on the latter issue and government assistance in the areas of R&D, technology transfer, marketing and procurement have been suggested.

The potential for growth of fibre optics in the next several years is great. It has been estimated that by 1989 the world market for optical fibres and associated products will amount to over \$4 billion. With the renovation of copper-based telecommunications systems around the world in the next two decades, the future of fibre optics looks even brighter in the 1990's and beyond. All this, however, does not mean that Canada will automatically be able to exploit this market to the fullest extent possible. Without a strong private sector such as that in the U.S., nor a public tool such as the PTT's in Japan, Britain, Germany, and France to back it up, the Canadian fibre optics industry may not be able to benefit much from the growth potential of the huge world market for fibre optic products. In the present circumstances, the government could assist the industry in its endeavour to compete vigorously in the world market in several ways, for example:

- i) Provision of generous tax incentives for R&D activities;
- ii) Transfer of technology developed in government research centres;
- iii) Commitment to apply fibre optics technology developed by Canadian firms to increase the efficiency of its services;
- vi) Commitment to use procurement policy to enable Canadian firms to develop a strong revenue base to move into the international scene;
- v) Provision of assistance in identifying and securing potential international markets for Canadian fibre optics technology and products;
- vi) Development of strong government long-range research capabilities to supplement research in the private sector and to ensure that Canadian industry has access to an assured pool of technical know-how to sustain its growth.

5.4.3 Radio Microwave

Radio microwave is expected to see continued use in the provision of back-up facilities for a given service. DTS is currently the most prominent bypass technology in the United States and may become the primary bypass technology in Canada particularly in meeting dedicated network requirements more economically than local telephone companies. Canadian equipment manufacturers and suppliers may also benefit by securing domestic and foreign market niches for their technological components.

Opportunities for MDS are the extension of cable services to unwired or partially wired markets and to private networks in remote locations. However, further R&D is required to obtain more information on interference and coverage characteristics, cost structures, and the potential benefits of MDS to Canada.

Though spectrum allocation and licensing regulations may constrain the development of radio microwave systems in Canada, the major threats will be from competing systems employing fibre optic technology. DTS must overcome competition from cable companies which already access homes and businesses with wideband capacity. Fibre optic networks, if developed by telephone companies, will pose the greatest threat to radio microwave systems. Although new systems are being installed, R&D activity in radio microwave is not increasing. Therefore, a key factor to success will be R&D assistance.

Both DTS and MDS services would require utilization of the already crowded radio spectrum. In the United States, DTS systems will be developed by non-dominant common carriers in the 10.6 GHz band and by private enterprises in the 18 GHz band. In Canada, the Department has recently issued microwave spectrum allocation policies in the 1-10 GHz band and has requested public comment for policy development for the 10-30 GHz bands. Provisions for a wide range of microwave applications, including MDS, are being made in these allocation policies. Certain frequencies in the 10, 18 and 23 GHz bands are relatively unused in Canada and could be allocated to new local commercial microwave services. DGTP is currently assessing the economic and commercial viability of local public commercial microwave services in major urban centres to ensure utilization of radio spectrum in the public interest.

Radio microwave technologies, such as DTS, would enable telecommunications users to bypass the public telephone network if costs and the desire to control telecommunications were sufficiently important to its users and the carriers did not provide such specialized services. In the U.S., a growing number of users are choosing to bypass the local telephone system and recent studies indicate a projected five-fold increase of this type bypass by 1990, resulting in revenue losses for local operating companies of \$9 billion annually. This includes bypass through both local and long distance networks. However, because of the efficiency and end-to-end telecommunications services, DTS could represent significant benefits to business users, manufacturers and service providers. The establishment of such facilities should, therefore, not be prohibited, but their role in the overall national telecommunications infrastructure would require further examination.

Although the 1983 Federal policy recognized the cable television industry as the central focus for providing all Canadians with greater program choice. MDS can significantly contribute towards the achievement of Canada's broadcasting objectives. However, in terms of multi-channel MDS, this technology is still in the embryonic stages and little is known about its parameters related to interference, coverage and cost structure for transmit and receive equipment. Further research and development is required if industry is to provide answers concerning its potential benefits to Canada.

5.4.4 Satellite Communication

The deregulation of ownership of transmitting earth stations in April, 1986 is expected to generate a substantial demand for private business networks for video, teletext, and voice communications. MSAT could provide another class of telephone service in remote and isolated communities by the 1990s. DBS may become feasible using existing Anik C satellite technology offering a fixed cost business with the potential for high marginal returns. DBS would also assist measurably in the pursuit of national broadcasting objectives (i.e., equalization in the level of services). Other opportunities for satellite systems include network bypass and the provision of a variety of broadcasting services such as narrowcasting and the delivery of signals to U.S. markets.

Satellite systems are currently plagued by a host of problems. Despite the potential demand there is currently a surplus of satellite capacity in Canada due to the recession, pay TV problems such as a shortage of programming services, and stagnant long distance traffic levels. Fibre optics, which is already cheaper for distances under 1,000 miles, and international broadcast stations are future threats to satellite systems in Canada.

Technological and political barriers to MSAT and DBS also exist. To become viable, MSAT will require technological development in the areas of narrowband/modulation, spacecraft payload performance and mobile antennas and terminals. Resolution of regulatory questions and an agreement with the U.S. on spectrum sharing is necessary as well. Using Anik C satellites, DBS implementation is limited by high costs which excludes much of the population. Delivery of DBS signals to cable systems has become a contentious issue between the Canadian Association of Broadcasters and the Canadian Cable and Television Association. Opposition from countries not desiring alien programming distributed to their populations is an additional political constraint.

To succeed, satellite communications systems will require a financially-sound customer base and access to current technology. This means possible institutional arrangements to optimize the utilization of Canadian satellite systems, to minimize potential threats from abroad and the analysis of alternative technological systems.

If the recommendations of the Telecommunications Policy Review are implemented, current policy and regulatory barriers, related to direct access to full and partial transponders, sale and resale, as well as sharing of transponders, will largely be removed. This would be a significant step in promoting a greater utilization of Canadian satellites. However, as mentioned above technological developments will not only enable the established industries to benefit from their applications but many other smaller business users, service providers and individual consumers.

Technological innovations are not unique to Canada, of course. For example, a number of developments in the United States will pose important policy implications for Canada:

- 1) The continued availability of U.S. broadcast signals and competition from national and international superstations will become increasingly difficult to control as small low cost earth stations proliferate in Canada. A competitive Canadian response will be required to lessen the negative impact on the Canadian broadcasting industry.
- 2) As a result of a relaxed regulatory environment in the United States and ensuing competition, transponder rental costs will decline drastically. It will be increasingly difficult, if not impossible, to restrict Canadian access to the U.S. satellite unless the Canadian scene becomes equally attractive.
- 3) The reduced cost of transmit/receive earth stations and their potential applications for private telephone and data networks will raise questions concerning their interconnection with public switch networks and access to U.S. satellite systems. It will become imperative to minimize regulatory constraints in these applications to permit the widespread growth of such systems in Canada, without recourse to U.S. by-pass mechanisms.

In reality, there is no choice--the policy and regulatory framework must encourage an unlimited number of satellite applications if Canada is to maximize the opportunities before it and minimize potential threats from abroad.

5.4.5 Cellular Mobile Radio

The main opportunities for cellular mobile radio are integrated public services for mobile urban communities and the content and software development businesses. The potential also exists for non-wireline licensees to create local/long distance public bypass networks with other carriers (e.g., CNCP) or other technologies (e.g., MSAT). CMR may also provide equipment manufacturers and suppliers with an opportunity to expand both their domestic and continental markets.

The major constraint to CMR implementation is the issue of spectrum allocation. Non-wireline licensees face the additional threat brought on by the fact that they depend on their competitors' plants. CMR is also expected to face competition from wireline communications systems which it is attempting to replace. This will require appropriate government regulation and controls.

The success of CMR will depend upon marketing design, system design (i.e., the integration and compatibility of multi-service units and multi-service delivery systems), reliable technical equipment and R&D assistance.

Improvements in the costs and capabilities of mobile radio systems, the industrial benefits they offer and the gradual emergence of cellular radio as the universal personal communications system raise issues and questions which need to be addressed so that desirable developments are not impeded. These include:

It is expected that users will want to minimize the number of distinct equipment components required for the many services they will want. This may well lead to the development of flexible multi-service units and to multi-service delivery systems, such as paging and narrowcasting on cellular radio. Operators of currently separate delivery systems or those with substantial investments in existing separate components will probably seek to maintain a legal separation of services and markets. The government could contribute to the achievement of compatibility for users by establishing equipment standards and regulations. It could also use other instruments available to it to encourage discussion and cooperation among the systems and service providers who will also benefit, in the longer term.

Low cost cellular mobile radio will undoubtedly compete and in many cases replace wireline communications, as well as other systems. It is quite possible that hybrid systems will evolve where remote and rural areas would be most economically served by satellites, radio systems and possibly SHARP, whereas urban areas would utilize cellular and wireline systems. In any

case, struggle for market share and market preservation will likely take place.

In this new technical and competitive market environment, government will have to ensure that system operators assume proper responsibility for universal coverage, reasonable and equitable rates, privacy and maintenance of service. Achievement of these goals is complicated by the different regulatory bodies involved. For example, communications are provincially controlled in some areas and federally in others. Depending upon the growth of the cellular market, the federal government may need to re-examine the number of suppliers which should be permitted to own the facilities and provide new services as the technology continues to evolve and new applications become available.

Location systems are already being proposed to keep track of parolees, to provide Emergency Location Systems for children and medical alert services for the elderly. Systems such as these have obvious benefits and concerns for society. The social implications of such services, as a result of expanding technical capabilities, will require further analysis.

5.4.6 Local Area Networks

LAN's capability to make interface connections with terminals makes them particularly advantageous for local bypass networks. Other opportunities include the integration of communications systems use in office automation systems and the provision of non-programming services. Expected growth in the latter two areas translates into the increased use of LAN's baseband networks which are expected to enjoy greater success than broadband networks since only one channel use is expected.

A major limitation to the current LAN growth is the lack of standards for network architecture, protocols or transmission media. As shown in Figure 1, LAN sales are expected to gain momentum in 1987 when IBM releases its token-ring architecture providing an industry standard.

It will also allow many of the network management functions to be incorporated into a VLSI chip and, hence, promote industrial growth. To the extent FM packet technology is implemented, LAN's spectrum allocation will arise as an issue. LAN growth will be determined, in part, by the role carriers will play since they control communications facilities linking LANs in larger networks and could exercise their monopoly power and unfairly limit competition.

Figure 1
Canadian Sales of Communications
Equipment for Local Area Networks
(millions of dollars)*

1984	\$2.0
1985	\$4.0
1986	\$9.0
1987	\$14.0
1988	\$20.0
1989	\$30.0

*Revenues are stated at the manufacturers' level and are expressed in constant 1984 dollars.

Local area networks can be provided by communications carriers, their subsidiaries or independent firms. Since local area networks will also be part of larger networks in which they are interconnected through a local and long-haul communications links, the carriers are obviously in an advantageous position due to their monopoly power and controls of communications facilities. It would be desirable for independent firms providing local area network facilities and services to be able to fairly compete with the carriers.

FM packet radio technology has already been mentioned as a possible future transmission medium for local area networks. This raises the problem of spectrum allocation. The choice of radio channels is a complex task involving the trade-off of many factors such as desired bandwidth, area coverage, spectrum availability, and potential interference.

The establishment of local area network standards would make it feasible to incorporate many of the network management functions into VLSI chip. This will reduce significantly the cost of network interface units and promote industrial growth.

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6.0 INDUSTRY PROFILE

6.1 Introduction

The Industry Profile section is intended to give an overall impression of the volume of revenues which are generated and the labor force employed within each industry sector. It is meant solely to provide supplemental information for the Market Profile section by illustrating the extent of revenue and employment mix among and between companies of various sizes and location in Canada.

The section has been organized according to the communications sector categories outlined in point 3.6. Companies (as many as could be identified and who, for the most part, constitute the principle players) have been assigned according to their revenues to one of four revenue groups which represent a minimum and maximum range of earnings. While uniformity was hoped to be maintained across sectors, the wide differences in revenues obtained by the various communications industries, specifically for telecommunications, warranted some minor variation between sectors. It should be noted that the four revenue groups for the telecommunications sector range from minus \$10 million to a high of plus \$500 million. For all other revenue groups the range is from a low of minus \$100 thousand to a high of plus \$10 million. Following the breakdown by revenue groups is a breakdown by provinces which should illustrate a further mix. The sources for this information have been numerous and varied. Consultation of the source list at the end of the section is suggested. The reader should also refer to the statistical highlights where a clarification and an interpretation of the revenue groups, industry players, etc. is detailed.

Caution should be exercised in any attempts to compare these revenue figures with other conventional published accounts (e.g., Statistics Canada publications). For the most part, the data is derived from actual returns, surveys, etc., conducted by private businesses, however, for the other part, the accuracy and timeliness of the information is qualified. Additionally, the companies included within the cultural industries, informatics and the manufacturing component are most probably a gross under-representation of the actual population of the industries considered given the scarcity of available, reliable and documented information.

TABLE 1
COMMUNICATIONS INDUSTRIES
1983-1984 - CANADA
TOTAL REVENUES
\$51,916,448,788

<u>Sub-Sector</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>	<u>No. Employed</u>
Telecommunications	\$10,135,147,043	19.52	124	113,132
Broadcasting and Cable	\$ 2,006,497,307	3.86	633	35,832
Radio and Television	\$ 1,325,313,369		286	16,571
CATV	531,918,938		346	6,787
CBC	149,250,000		1	12,473
Cultural Industries	\$ 9,051,883,827	17.44	563	107,631
Performing Arts	221,995,848		141	28,515
Visual Arts	101,877,979		59	1,645
Gov't Grants and Contrib.(1)	379,887,000		-	-
Film and Video	921,170,000		43	13,551
Book Publishing	1,748,108,000		105	17,359
Newspaper Publishing	5,087,062,500		107	67,411
Periodical Publishing	238,182,500		32	5,094
Sound Recording(2)	353,600,000		76	2,571
Informatics(3)	\$18,904,923,937	36.41	396	21,629
Space	\$ 262,585,174	0.51	40 ⁽⁴⁾	3,049
Manufacturing(5)	\$11,555,411,500	22.26	1,038	75,731
			2,803	570,226

(1) Statistics Canada, Catalogue 68-211, 1984.

(2) Statistics Canada, Cat. 87-001, Vol. 6; No. 5, 1983.

(3) Hardware and software sales and service providers.

(4) The industry group included may be duplicated within the manufacturing group, and is separated in Table 1 from this latter group to reflect the market share of the space sector.

(5) Includes telecommunications, broadcasting and cable, space, and informatics hardware (excluding assembly) manufacturing.

6.2 Communications Industries: Statistical Highlights

The importance in the above table demonstrates some rather disproportionate values between Communications Industry sectors in terms of revenues earned, number of firms and workers employed. The informatics sector (see points 6.5 and 7.5 for a clarification of the industry group) generated revenues of over \$18.9 billion or 36.41 percent of the total revenues for all sectors, as much as 53 percent more than the Telecommunications sector, usually regarded as the top earning sectors which generated revenues in 1983-1984 of just over \$10 billion or 19.44 percent overall.

In relative terms, the Cultural industries generated outstanding earnings of over \$9 billion, that is, 17.44 percent of total Communications industry revenues. The "cultural" composite is more tempered when it reflects a 56.20 percent (\$5 billion) share earned by the Newspaper Publishing subsectors: a 19.31 percent (\$1.7 billion) share earned by the Book publishing subsector; and a 10.18 percent (\$921 million) share generated by the Film and Video subsector: both firms and products within these subsectors being grossly overrepresented by foreign ownerships and imports. The remainder of the \$9 billion was divided between the Sound Recording subsector with \$353.6 million or 3.91 percent, the Periodical Publishing sector with revenues of \$238.1 million or 2.63 percent, the Performing Arts generating \$221.9 million or 2.45 percent of the Visual Arts with 1.13 percent or \$101.8 million revenues, Government grants and contributions to the cultural industries representing a figure of 4.20 percent or \$380 thousand.

Broadcasting and Cable tabled in fifth place with just over \$2 billion (3.86 percent) of revenues distributed among the Radio and Television subsector with a considerable 66.05 percent (\$1.3 billion) share, the CATV subsector with 26.51 percent representing revenues of \$531.9 million and the CBC with the last 7.44 percent or \$149.2 million. The Space sector accounted for 0.51 percent of the industries generating revenues of \$262.5 millions. The Manufacturing group which is a mixture of several sectors grossed over \$11.5 billion or 22.26 percent of total Communications Industries revenues for the years 1983-1984.

A further examination of the statistics for the Communications industries reveals some interesting disparities between the industry categories. For example, on the one hand, the Informatics sector accounted for only 6.06 percent of the total employees, yet earned 36.41 percent of the total revenues--a very low ratio of employees to earnings. The Cultural industries, on the other hand, had a high ratio of employees to earnings, employing 30.15 percent of the overall industry total, but earning only 17.44 percent of the overall revenues. Comparative percentages for the other industry sectors for 1983-1984 were: Telecommunications with 31.69 percent of the employees and 19.52 percent of the revenue; Broadcasting and

Cable with 6.28 percent of the employees and 3.86 percent of the revenues; Space with .85 and .51 respectively; Manufacturing with 21.21 percent of the employees and 22.26 percent of the revenues.

As will be seen from the Tables to follow, a pattern in both revenue earnings by firms and in the location of these firms in certain provinces is very evident. A very small number of very large firms in all sectors and within most subsectors were concentrated in the province of Ontario and generated, on average, 55.42 percent of all revenues within the Communications Industry sectors. Quebec was not even a close second with 14.10 percent, British Columbia a far third with 10.35 percent, Alberta with 8.28 percent and the remaining provinces representing a decreasing average in revenue earnings overall.

TABLE 2
TELECOMMUNICATIONS CARRIAGE INDUSTRY
1984 - CANADA
TOTAL REVENUES
\$10,135,147,043(1)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms(2)
\$500m+	7,401,900,260	73.13	3
\$100m to \$500m-1	2,171,679,616	21.43	10
\$10m to \$100m-1	371,454,532	3.67	7
>\$10m	190,112,635	1.88	106
			126

(1)Source: Annual Reports.

(2)Firms having major activities in more than one province, e.g., Bell Canada, CNCP, have had their revenues distributed within the provinces involved, but are counted once which explains the discrepancy in totals for number of firms.

6.2 Telecommunications Carriage Industry: Statistical Highlights

The telecommunications carriage industry subsector represents 19.67 percent of the communications industry total revenues.

The telecommunications carriage industry comprises 126 companies of which 14 earned 98 percent of total industry revenues.(1) Revenues for another 104 common carriers are accounted for as part of a 2 percent estimate derived from the actual revenues of these top 14 firms and their revenues have been apportioned according to the number of telephones distributed within each province. Also included are the 1984 revenues for CNCP Telecommunications, Terra Nova Telecommunications Inc., the North American Telegraph Co., Eastern Telephone and Telegraph Co., Telesat Canada and Teleglobe Canada. Excluded are the more than 200 radio common carriers who provide mobile radio and radio-paging in competition with telephone companies. The 1982 revenues for this group were estimated at \$75 million.(2) This represented 1 percent of 1982 revenues which can be interpolated to give us a 1984 revenue estimated at just over \$100 million.

(1)Statistics Canada, Catalogue 56-203, 1983.

(2)Government of Canada, Department of Communications. Canadian Telecommunications: An Overview of the Canadian Telecommunications Carriage Industry, July 1983.

As a group, the telecommunications carriers in 1984 realized increases in revenues of 8 percent over 1983. Based on a comparison of the percentage distribution of 1983 revenues⁽¹⁾, increases were obtained in most provinces with the exception of Quebec, Ontario, British Columbia and have experienced minor decreases: .1, .2, .5 and 2 percent, respectively. As can also be ascertained from Table 1, 94 percent of total telecommunications revenues for 1984 are accounted for by 13 firms⁽²⁾: Three of these firms account for 73% of all revenues generated by telephone companies in Canada with another group of 10 trailing behind capturing 18 percent of the total telecommunications carriage revenues. The combined share of the market for this group exceeds by more than 20 times the combined revenues of the group below them. The carriage industry is characterized, therefore, by a very high degree of concentration by local and national oligopolies. On a provincial basis, the bulk of the revenues are generated within Quebec and Ontario, i.e., revenues being accrued to Bell Canada. These two provinces accounted for some \$5.7 billion or 57 percent of the overall \$10 billion revenue for the country as a whole. Ontario generated almost 35 percent of the total, while Quebec accounted for 24 percent. Alberta and British Columbia had almost equal shares of the market with 11.83 and 11.85 percent, respectively. The other provinces and territories had market shares ranging downward from 3.9 percent for Saskatchewan to .3 percent for Prince Edward Island.

Local carriers comprised roughly 84 percent of the industry total, but earned only 1.88 percent of the revenues.

In looking at the overall revenue distribution picture; Ontario had the highest share with 33.46 percent, Quebec was next with 24.3 percent, followed by British Columbia with 12 percent and Alberta with 11.96 percent. Provincial shares then fell off to slightly less than 4 percent for Saskatchewan and continued to decline to a low of .31 percent for P.E.I.

There were 113,132 employees in the industry for the year and these were distributed across the country in close proportions to the distribution of revenues. For example, Alberta had 11.96 percent of revenues and 11.89 percent, of employees. The figures for Quebec were 24.3 percent and 23.2 percent, respectively. A similar close alignment existed for the remaining provinces and territories.

(1) This method is adopted because most telephone companies in Canada follow similar pricing schedules and comparable rate structures.

(2) Canadian Telecommunications, op.cit. p. 16. This group is different from the Statistics Canada group of 14 in which Telesat and Teleglobe are not a part.

TABLE 3
TELECOMMUNICATIONS CARRIAGE INDUSTRY
REVENUE GROUP (\$500m+)
\$7,401,900,260 (73.03%)

Province	Total Revenues	% of Total Revenues	No. of Firms ⁽¹⁾
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	2,109,891,280	28.50	1
Ontario	3,165,365,980	42.76	1
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	978,843,000	13.22	1
British Columbia	1,147,800,000	15.51	1
Yukon	-	-	-
Northwest Territories	-	-	-
			3

(1) See Note (2) Table 2.

TABLE 4
TELECOMMUNICATIONS CARRIAGE INDUSTRY
REVENUE GROUP (\$100m to \$500m-1)
\$2,171,679,616 (21.43%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	323,948,363	14.92	2
Prince Edward Island	-	-	-
Nova Scotia	282,180,000	12.99	1
New Brunswick	229,591,000	10.57	1
Quebec	164,066,000	7.55	1
Ontario	-	-	-
Manitoba	294,248,000	13.55	1
Saskatchewan	382,724,000	17.62	1
Alberta	184,320,253	8.49	1
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
*Telesat	109,171,000	5.03	1
*Teleglobe	201,431,000	9.28	1
			10

*Separated out so not to bias provincial distributions. For a provincial distribution of these totals, see Table 7.

TABLE 5
TELECOMMUNICATIONS CARRIAGE INDUSTRY
REVENUE GROUP (\$10m to \$100m-1)
 \$371,454,532 (3.67%)

Province	Total Revenues	% of Total Revenues	No. of Firms ⁽¹⁾
Newfoundland & Labrador	38,189,000	10.28	1
Prince Edward Island	30,534,000	8.22	1
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	99,981,000	26.92	1
Ontario	46,220,156	12.44	2
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	15,552,278	4.19	1
Yukon	53,722,977	14.46	1
Northwest Territories	87,255,121	23.49	2
			7

(1) See Note (2) Table 2.

TABLE 6
TELECOMMUNICATIONS CARRIAGE INDUSTRY
REVENUE GROUP (>\$10m)
 \$190,112,635 (1.88%)

Province	Total Revenues	% Total Revenues	No. of Firms
Newfoundland & Labrador	4,987,421 ⁽¹⁾	2.62	2
Prince Edward Island	850,238	.45	-
Nova Scotia	6,216,186	3.27	2
New Brunswick	4,780,228	2.51	-
Quebec	45,705,032	24.04	20
Ontario	68,585,889	36.08	31
Manitoba	8,521,277	4.48	-
Saskatchewan	7,878,874	4.14	51
Alberta	19,706,634	10.37	-
British Columbia	21,917,254	11.53	-
Yukon	377,883	.20	-
Northwest Territories	585,719	.31	-
			106

(1) Combined revenues for NAT and ETT of \$1,170,796. Statistics Canada, Catalogue 56-201, 1983.

TABLE 7
TELECOMMUNICATIONS CARRIAGE INDUSTRY
TOTAL REVENUES BY PROVINCE
 \$10,135,147,043

Province	Total Revenues	Telesat Canada	Teleglobe ⁽¹⁾ Canada	% of Total Revenues	No. Employed
Newfoundland & Labrador	367,124,784	1,176,000	1,410,017	3.65	3,939
Prince Edward Island	31,384,238	-	201,431	.31	300 ⁽²⁾
Nova Scotia	288,396,186	2,200,000	2,618,603	2.89	3,553
New Brunswick	234,371,228	721,000	805,724	2.33	2,411
Quebec	2,419,643,312	6,714,000	37,869,028	24.31	26,288
Ontario	3,280,172,025	10,629,000	100,111,207	33.46	35,216
Manitoba	302,769,277	1,106,000	1,611,448	3.01	4,537
Saskatchewan	390,602,874	1,028,000	2,417,172	3.89	4,382
Alberta	1,182,869,887	3,926,000	25,768,858	11.96	13,454
British Columbia	1,185,269,532	1,925,000	30,416,081	12.01	13,449
Yukon	54,100,860	160,000	1,007,155	.55	625
Northwest Territories	87,840,840	9,100,000	1,007,155	.97	1,006
					<u>109,160</u>
Telesat Canada		109,171,000 ⁽⁴⁾			2,096 ⁽³⁾
Teleglobe Canada			201,431,000		520
					<u>1,356</u>
					<u>113,132</u>

- (1) Based on the percentage number of outgoing services (refer to points 7.6.2 Market Profile-Space).
 Teleglobe Canada spokesperson, 1985.
- (2) Statistics Canada, Catalogue 56-703, 1983.
- (3) Estimate of 2% added. See text for explanation.
- (4) Included in the total for Telesat Canada are \$6,283,000 in revenues from Other Jurisdictions and \$64,203,000 in revenues from the Federal Government (Space) Program. Telesat Canada, September 25, 1985.

TABLE 8
RADIO AND TELEVISION BROADCAST INDUSTRY(1)
1983-1984 - CANADA
\$1,325,313,369(2)(3)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10M +	892,388,412	67.33	30
\$1M to \$10M-1	365,765,384	27.60	128
\$100K to \$1M-1	66,751,504	5.04	122
>\$100K	408,069	.03	6
			286(3)

(1) Source: DOC, CRTC, Statistics Canada joint annual returns.

(2) This amount exceeds by \$46.7 million the total operating revenues of the Radio and Television Broadcasting Industry as stated in Statistics Canada, Catalogue 56-204 for 1984.

(3) The discrepancy between "Reporting Unit" and "Business Organization" as defined by Statistics Canada compared to the number of firms used in this analysis make comparisons problematic both for revenues and firms.

6.3 Broadcasting and Cable: Statistical Highlights

The broadcasting and cable subsector represents 3.89 percent of the overall communications industry total revenues. Of this percentage, radio and television represents 66.05 percent of the revenues, CATV broadcasters represents 26.51 percent, and the CBC represents 7.44 percent of the revenues realized by this industry subsector.

6.3.1 Radio and Television Broadcast Industry

The 286 radio and television broadcasters who make up this industry subsector are all commercial broadcasting stations in operation in Canada in 1983. Excluded from this group are the national network, the Canadian Broadcasting Corporation (which is grouped separately), and all non-commercial broadcasting stations, i.e., broadcasting stations operated by religious groups, educational institutions and provincial governments, and television rebroadcasting stations.

Revenues for the radio and television broadcasters in 1983 were over \$1.3 billion, representing an 8.4 percent increase

(Text continued on page 79)

TABLE 9
RADIO AND TELEVISION BROADCAST INDUSTRY
REVENUE GROUP (\$10M+)
\$892,388,412 (67.33%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	11,961,752	1.34	1
New Brunswick	-	-	-
Quebec	202,599,950	22.70	6
Ontario	421,554,935	47.24	11
Manitoba	48,409,199	5.42	2
Saskatchewan	25,765,162	2.89	2
Alberta	124,029,909	13.90	5
British Columbia	58,067,505	6.51	3
Yukon	-	-	-
Northwest Territories	-	-	-
			30

TABLE 10
RADIO AND TELEVISION BROADCAST INDUSTRY
REVENUE GROUP (\$1M to \$10M-1)
\$365,765,384 (27.60%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	14,012,015	3.83	4
Prince Edward Island	1,623,063	.44	1
Nova Scotia	15,991,449	4.37	8
New Brunswick	20,549,453	5.62	7
Quebec	59,186,524	16.18	17
Ontario	133,868,823	36.60	41
Manitoba	16,608,464	4.54	5
Saskatchewan	14,973,799	4.09	8
Alberta	36,417,026	9.96	15
British Columbia	52,534,768	14.36	22
Yukon	-	-	-
Northwest Territories	-	-	-
			128

TABLE 11
RADIO AND TELEVISION BROADCAST INDUSTRY
REVENUE GROUP (\$100K to \$1M-1)
 \$66,751,504 (5.04%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	1,003,807	1.50	2
Nova Scotia	3,230,309	4.84	6
New Brunswick	5,310,096	7.96	9
Quebec	19,498,984	29.21	42
Ontario	13,500,924	20.23	23
Manitoba	4,312,882	6.46	6
Saskatchewan	2,685,196	4.02	4
Alberta	6,020,592	9.02	9
British Columbia	10,340,080	15.49	19
Yukon	470,037	.70	1
Northwest Territories	378,597	.57	1
			<hr/> 122

TABLE 12
RADIO AND TELEVISION BROADCAST INDUSTRY
REVENUE GROUP (>\$100K)
 \$408,069 (.03%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	173,149	42.43	2
Ontario	100,541	24.64	2
Manitoba	63,373	15.53	1
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	71,006	17.40	1
Yukon	-	-	-
Northwest Territories	-	-	-
			<hr/> 6

TABLE 13
RADIO AND TELEVISION BROADCAST INDUSTRY
TOTAL REVENUES
\$1,325,313,369

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	14,012,015	1.06	4	303
Prince Edward Island	2,626,870	.20	3	68
Nova Scotia	31,183,510	2.35	15	612
New Brunswick	25,859,549	1.95	16	462
Quebec	281,458,607	21.24	67	3,671
Ontario	569,025,223	42.94	77	5,876
Manitoba	69,393,918	5.24	14	1,027
Saskatchewan	43,424,157	3.28	14	695
Alberta	166,467,527	12.56	29	2,040
British Columbia	121,013,359	9.13	45	1,793
Yukon	470,037	.04	1	13
Northwest Territories	378,597	.03	1	11
			286	16,571

over 1982 revenues of \$1.22 billion. Just released 1984 revenues of \$1.45 billion for this industry indicate a continuing upward trend of approximately 10 percent⁽¹⁾ over the 1983 revenue. Although the top 20 firms earned 67.3% of the industry revenues, the market is distributed across Canada in rough proportion to the population distribution.

In 1983 there were 16,571 people employed by the commercial radio and television broadcasting industry, a number changed only slightly from 1982. The 1984 employee total of 17,240 indicates a gradual upward movement by 4 percent over the 1983 figure.

In looking at the statistics from a provincial viewpoint, Ontario was far out in front in revenues, the number of employees and the number of firms. The province had 77 firms (27%) employing 5,876 people (35.4%) and earning \$569 million

(Text continued on page 83)

(1) Mindful of the discrepancy cited earlier with Statistics Canada data, the percentage increase noted deviates conservatively from the Statistics Canada 1984 percentage increase over 1983 of 15.4%.

TABLE 14
RADIO AND TELEVISION BROADCAST INDUSTRY
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND AND LABRADOR

\$14,012,015 (1.06%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	14,012,015	100.00	4
>\$100k	-	-	-
			<hr style="width: 100%; border: 0.5px solid black;"/> 4

PRINCE EDWARD ISLAND

\$2,626,870 (.20%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	1,623,063	61.79	1
\$100k to \$1m-1	1,003,807	38.21	2
>\$100k	-	-	-
			<hr style="width: 100%; border: 0.5px solid black;"/> 3

NOVA SCOTIA

\$31,183,510 (2.35%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	11,961,752	38.36	1
\$1m to \$10m-1	15,991,449	51.28	8
\$100k to \$1m-1	3,230,309	10.36	6
>\$100k	-	-	-
			<hr style="width: 100%; border: 0.5px solid black;"/> 15

NEW BRUNSWICK

\$25,859,549 (1.95%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	20,549,453	79.47	7
\$100k to \$1m-1	5,310,096	20.53	9
>\$100k	-	-	-
			<hr style="width: 100%; border: 0.5px solid black;"/> 16

QUEBEC

\$281,458,607 (21.24%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	202,599,950	71.98	6
\$1m to \$10m-1	59,186,524	21.03	17
\$100k to \$1m-1	19,498,984	6.93	42
>\$100k	173,149	.06	2
			<hr/> 67

ONTARIO

\$569,025,223 (42.94%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	421,554,935	74.08	11
\$1m to \$10m-1	133,868,823	23.53	41
\$100k to \$1m-1	13,500,924	2.37	23
>\$100k	100,541	.02	2
			<hr/> 77

MANITOBA

\$69,393,918 (5.24%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	48,409,199	69.76	2
\$1m to \$10m-1	16,608,464	23.93	5
\$100k to \$1m-1	4,312,882	6.22	6
>\$100k	63,373	.09	1
			<hr/> 14

SASKATCHEWAN

\$43,424,157 (3.28%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m +	-	-	-
\$1m to \$10m-1	25,765,162	59.33	2
\$100k to \$1m-1	14,973,799	34.48	8
>\$100k	2,685,196	6.18	4
			<hr/> 14

ALBERTA

\$166,467,527 (12.56%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	124,029,909	74.51	5
\$1m to \$10m-1	36,417,026	21.88	15
\$100k to \$1m-1	6,020,592	3.62	9
>\$100k	-	-	-
			<hr/> 29

BRITISH COLUMBIA

\$121,013,359 (9.13%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	58,067,505	47.98	3
\$1m to \$10m-1	52,534,768	43.41	22
\$100k to \$1m-1	10,340,080	8.54	19
>\$100k	71,006	.06	1
			<hr/> 45

YUKON

\$470,037 (.04%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	470,037	100.00	1
>\$100k	-	-	-
			<hr/> 1

NORTHWEST TERRITORIES

\$378,597 (.03%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	378,597	100.00	1
>\$100k	-	-	-
			<hr/> 1

(42.9) in revenues. Quebec came closest to Ontario in all categories, although significantly below Ontario in the number employed and revenues earned. Quebec had 67 firms (23.4%) employing 3,671 people (22.1%) and earning \$281.5 (21.2%) in revenue. No other single province approached the figures for Ontario and Quebec. British Columbia had 9.13% of the revenues, 10.8% of the employees and represented 15.7% of the industry firms. The Prairie Regions, with 19.9% of the industry firms, had 22.7% of the employees and accounted for 21% of the revenues. Within the region, Alberta had by far the highest proportions in all three categories. The Atlantic provinces, while having 13.3% of the firms, had only 8.7% of the employees and generated 7.5% of industry revenues. Within the Atlantic provinces, Nova Scotia had the highest share in all categories. The distribution was less than 1% in all categories in the Yukon and the Northwest Territories.

TABLE 15
CATV BROADCAST INDUSTRY
1983-1984 - CANADA
\$531,918,938

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	290,085,745	54.54	11
\$1m to \$10m-1	173,892,426	32.69	59
\$100k to \$1m-1	64,513,298	12.13	171
>\$100k	3,427,469	.64	105
			346

6.3.2 Cable Television Broadcast Industry

In the context of this analysis, the 1983 CATV broadcast industry was made up of 346 business organizations, either individually-owned or incorporated.

Total revenues to the CATV broadcasters were \$531.9 million in 1983. Of this amount, the 11 major firms which comprise only 3% of the industry, had revenues in excess of \$10 million which accounted for some \$290 million, or 54.5% of the revenue total. Some \$173.9 million (32.69%) was earned by 59 firms (17% of the industry) with gross revenues in the \$1M to \$10M range. The balance of the revenue, \$67.9 million, was generated by 276 (80%) of the firms, with 171 of these earning \$64.5 million (12.13%) and 105 firms, each with earnings of less than \$100K for the year, accounting for less than 1% (\$3.4M).

The number of employees in the industry was up from 5,965 in 1982 to 6,787 in 1983, an increase of 822 or 13.8%.

On a provincial basis, only four provinces had firms with earnings in excess of \$10 million and, as indicated earlier, these firms accounted for 54.5% or \$290 million of total 1983 revenues for the industry. Of the four provinces, Ontario was well out in front with 3 firms earning \$115 million (39.65%). Quebec followed with 3 firms and \$82.3M (28.37%). British Columbia had only 2 firms with earnings in this range and they grossed \$46 million

(Text continued on page 87)

TABLE 16
CATV BROADCAST INDUSTRY
REVENUE GROUP (\$10M+)
 \$290,085,745 (54.54%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	82,294,607	28.37	3
Ontario	115,020,455	39.65	3
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	45,853,148	15.81	3
British Columbia	46,917,535	16.17	2
Yukon	-	-	-
Northwest Territories	-	-	-
			11

TABLE 17
CATV BROADCAST INDUSTRY
REVENUE GROUP PROVINCE (\$1m to \$10m-1)
 \$173,892,426 (32.69%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	3,698,884	2.13	1
Prince Edward Island	1,068,466	.61	1
Nova Scotia	9,685,537	5.57	5
New Brunswick	8,468,541	4.87	3
Quebec	17,604,828	10.12	8
Ontario	48,812,201	28.07	15
Manitoba	16,443,342	9.46	3
Saskatchewan	12,060,446	6.94	3
Alberta	15,559,912	8.95	4
British Columbia	39,470,005	22.70	15
Yukon	1,020,268	.59	1
Northwest Territories	-	-	-
			59

TABLE 18
CATV BROADCAST INDUSTRY
REVENUE GROUP (\$100k to \$1m-1)
 \$64,513,298 (12.13%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	2,346,667	3.64	6
Prince Edward Island	-	-	-
Nova Scotia	5,451,350	8.45	12
New Brunswick	2,534,680	3.93	8
Quebec	17,848,436	27.67	50
Ontario	17,215,253	26.68	46
Manitoba	2,271,435	3.52	6
Saskatchewan	3,669,091	5.69	5
Alberta	2,002,000	3.10	7
British Columbia	9,789,170	15.17	26
Yukon	-	-	-
Northwest Territories	900,364	1.40	3
			171

TABLE 19
CATV BROADCAST INDUSTRY
REVENUE GROUP PROVINCE (>\$100k)
 \$3,427,469 (.64%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	90,102	2.63	2
Prince Edward Island	-	-	-
Nova Scotia	56,739	1.66	2
New Brunswick	105,740	3.09	3
Quebec	1,607,895	46.91	50
Ontario	389,115	11.35	11
Manitoba	82,249	2.40	4
Saskatchewan	37,186	1.08	4
Alberta	135,754	3.96	3
British Columbia	895,089	26.12	25
Yukon	-	-	-
Northwest Territories	27,600	.81	1
			105

TABLE 20
CATV BROADCAST INDUSTRY
TOTAL REVENUES
\$531,918,938

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	6,135,653	1.15	9	73
Prince Edward Island	1,553,318	.29	2	32
Nova Scotia	15,193,626	2.86	20	204
New Brunswick	11,108,961	2.09	14	150
Quebec	119,355,762	22.43	111	1,487
Ontario	181,437,024	34.11	75	2,356
Manitoba	18,797,026	3.56	13	165
Saskatchewan	15,766,723	2.95	12	257
Alberta	63,550,814	11.95	17	885
British Columbia	97,071,799	18.25	68	1,146
Yukon	1,020,268	.19	1	16
Northwest Territories	927,964	.17	4	16
			346	6,787

(16.7%). British Columbia was followed closely by Alberta with \$45.8 million (15.81%) being earned by 3 firms.

All provinces and the Yukon were represented by firms with 1983 revenues in the \$1M to \$10M range. Total revenues in this category were \$173.8 million. Of this total, 15 firms in Ontario accounted for \$48.8 million (28%) and 15 firms in British Columbia for \$39.4 million (22.7%). Firms in Quebec earned 10.1% of the revenues in this range, with firms in Manitoba and Alberta earning 9.4% and 8.9%, respectively. Total revenues in the \$1M to \$10M range accounted for 32.69% of the subsector total.

In the \$100K to \$1M range, revenues were earned by 171 (50%) of the subsector group and amounted to a 1983 total of \$64.5 million or 12.13% of total revenues. Quebec, with \$17.8 million, and Ontario, with \$17.2 million, had the largest share of revenues in this category. British Columbia followed the two central provinces with \$9.8 million and Nova Scotia was next at \$5.4 million. The remaining provinces and the Northwest Territories had smaller shares in the revenues in the category and the Yukon had no percentage share at all. The distribution of revenue by provinces was in direct proportion to the distribution of firms. For example, Ontario, with 26.68% of the revenue, had 26.9% of the firms with

(Text continued on page 91)

TABLE 21
CATV BROADCAST INDUSTRY
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND AND LABRADOR

\$6,135,653 (1.1%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	3,698,884	60.29	1
\$100k to \$1m-1	2,346,667	38.25	6
>\$100k	90,102	1.46	2
			9

PRINCE EDWARD ISLAND

\$1,553,318 (.29%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	1,068,466	68.79	1
\$100k to \$1m-1	484,852	31.21	1
>\$100k	-	-	-
			2

NOVA SCOTIA

\$15,193,626 (2.86%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	9,685,537	63.75	5
\$100k to \$1m-1	5,451,350	35.88	13
>\$100k	56,739	.37	2
			20

NEW BRUNSWICK

\$11,108,961 (2.09%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	8,468,541	76.23	3
\$100k to \$1m-1	2,534,680	22.82	8
>\$100k	105,740	.95	3
			14

QUÉBEC

\$281,458,607 (21.24%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	82,294,607	68.95	3
\$1m to \$10m-1	17,604,824	14.75	8
\$100k to \$1m-1	17,848,436	14.95	50
>\$100k	1,607,895	1.35	50
			<hr/>
			111

ONTARIO

\$181,437,024 (34.11%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	115,020,455	63.39	3
\$1m to \$10m-1	48,812,201	26.91	15
\$100k to \$1m-1	17,215,253	9.49	46
>\$100k	389,115	.21	11
			<hr/>
			75

MANITOBA

18,797,026 (3.56%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	16,443,342	87.48	3
\$100k to \$1m-1	2,271,435	12.08	6
>\$100k	82,249	.44	4
			<hr/>
			13

SASKATCHEWAN

\$15,766,723 (2.95%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	12,060,446	76.49	3
\$100k to \$1m-1	3,669,091	23.27	5
>\$100k	37,186	.24	4
			<hr/>
			12

ALBERTA

\$63,550,814 (11.95%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	45,853,148	72.15	3
\$1m to \$10m-1	15,559,912	24.48	4
\$100k to \$1m-1	2,002,000	3.15	7
>\$100k	135,754	.22	3
			<hr/> 17

BRITISH COLUMBIA

\$97,071,799 (18.25%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	46,917,535	48.33	2
\$1m to \$10m-1	39,470,005	40.66	15
\$100k to \$1m-1	9,789,170	10.08	26
>\$100k	895,089	.93	25
			<hr/> 68

YUKON

\$1,020,268 (.19%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	1,020,268	100.00	1
>\$100k	-	-	-
			<hr/> 1

NORTHWEST TERRITORIES

\$927,964 (.17%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m +	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	900,364	97.03	3
>\$100k	27,600	2.97	1
			<hr/> 4

earnings in the \$100K to \$1M range. B.C. with 15.1% of the revenue had 15.2% of the firms.

Revenue in the range of \$100K or less, although generated by 105 firms, or 30.3% of the total for the industry, accounted for somewhat less than 1% of firms earning some \$1.6 million or 46.91% of the total \$3.4 million for the category. British Columbia firms had a 26% share and Ontario firms earned 11.3%. All other provinces and the Northwest Territories had less than 4% of the revenues in this category.

TABLE 22
CANADIAN BROADCASTING CORPORATION
1983-1984 REVENUES BY PROVINCES⁽¹⁾
 \$149,250,071⁽²⁾

Province	Total Revenues	% of Total Revenues	No. Empl'd
Newfoundland & Labrador	16,329,591	10.94	1,364
Prince Edward Island	835,884	.56	69
Nova Scotia	9,343,989	6.26	780
New Brunswick	4,731,700	3.17	395
Quebec	28,285,717	18.95	2,370
Ontario	23,912,253	16.02	1,998
Manitoba	9,821,637	6.58	820
Saskatchewan	8,642,443	5.79	722
Alberta	11,836,714	7.93	989
British Columbia	27,464,760	18.40	2,295
Yukon	1,537,429	1.03	128
Northwest Territories	6,507,954	4.36	543
			12,473

(1) The distribution of CBC revenues for 1983-1984 is calculated according to the number of radio and television stations and rebroadcasting transmitters in operation within each of the provinces and territories. In actual fact, of the CBC's 652 radio stations, most operate on a cost basis and, of the CBC's 609 television stations, some operate on a cost basis as well. That is, actual CBC-owned radio and television stations have no revenues which approach the distribution formula used for this analysis. The analysis was used simply to gauge the potential market performance within the province.

(2) The actual total is \$193,425,000 but \$16.6M as payments to affiliates and \$26.5 as commission to agencies and networks has been subtracted. To avoid double counting, the amount of \$43.1M (\$16.6 and \$26.5) is excluded also from the calculation of the total Cable Broadcasting Subsector Industry Analysis in Table 1.

6.3.3 Canadian Broadcasting Corporation

In fiscal 1983-1984 (to March 31) the CBC generated revenues of \$192,325,000, an increase of 15.4% over the previous fiscal year. From earned revenues, approximately \$43.1 million was expended as payments to affiliates (\$16.6 million) and as commissions to agencies and networks (\$26.5 million). In addition to the revenues generated through advertising and miscellaneous income, some \$813.3 million was appropriated by Parliament to meet CBC operating and capital expenses for 1983-1984. CBC operating expenses for the year were \$979.4 million, up by 10% over the previous fiscal year and representing a cost of about \$40.00 for each Canadian.

Looking at the distribution of CBC revenues by province (see (1) of Table 22), Quebec (18.9%) and Ontario (16%) earned the largest share, accounting for 53.3% of the total. These provinces were followed by Newfoundland and Labrador with 10.9%, Alberta with 6.6%, Nova Scotia with 6.3% and Saskatchewan with 5.8%. All other provinces and territories contributed less than 5%, with P.E.I. accounting for only .56% of the total revenues.

CBC employment was 12,473 for the year, and increase of 139 employees or 1.13%. Given the provincial distribution of the 1,261 radio and television stations of the CBC, the distribution of those employed at each station is as follows. Numbers employed were greatest in Quebec (2,370), British Columbia (2,295) and Ontario (1,998), with these three provinces accounting for 53.4% of the total. The Corporation had 1,364 employees in Newfoundland and Labrador, while all other provinces and territories had less than 1,000 each.

TABLE 23
CULTURAL INDUSTRIES
PERFORMING ARTS
1983-1984 - CANADA
 \$221,995,848

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	54,251,073	24.44	4
\$1m to \$10m-1	130,370,106	58.73	42
\$100k to \$1m-1	37,285,229	16.80	94
>\$100k	89,440	.04	1
			141

6.4 Cultural Industries: Statistical Highlights

6.4.1 Performing Arts

Statistical material for tables 23 thru 29 is, for the most part, derived from The Council for Business and the Arts in Canada (CBAC) Annual Survey of Performing Arts organizations in theatre, dance, music and opera. Revenues in 1983-1984 for performing arts firms amounted to approximately \$222 million. Table 23 indicates a significant degree of concentration in the performing arts with 4 firms (2.84 percent of all firms) controlling almost 25 percent of total industry revenues or \$54.2 million. The next 42 firms (30 percent of all firms) had earnings of \$130.3 million or close to 59 percent of total industry revenues. The remaining 95 firms (67 percent) had revenues of \$37.3 million or approximately 17 percent of total industry revenues. Geographical concentration of firms in all revenue groups is evident with Ontario accounting for almost 42 percent of total revenues and representing 40 percent of all firms. A ratio of revenues to firms was accounted, respectively, by Alberta with 18 firms (12.77 percent) earning 15.08 percent of all revenues; Quebec, 21 (14.89), 14.20 percent; Saskatchewan, 6(4.26), 10.36 percent; and British Columbia with 22 firms (15.6 percent) earning 9.2 percent of total revenues.

TABLE 24
CULTURAL INDUSTRIES
PERFORMING ARTS
REVENUE GROUP (\$10m+)
\$54,251,073 (24.44%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	23,251,073	42.86	2
Manitoba	-	-	-
Saskatchewan	20,000,000	36.86	1
Alberta	11,000,000	20.28	1
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
			4

TABLE 25
CULTURAL INDUSTRIES
PERFORMING ARTS
REVENUE GROUP (\$1m to \$10m-1)
\$130,370,106 (58.73%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	3,317,383	2.54	1
Nova Scotia	1,385,032	1.06	1
New Brunswick	1,210,664	.93	1
Quebec	26,529,250	20.35	9
Ontario	54,755,012	42.00	15
Manitoba	9,857,898	7.56	3
Saskatchewan	-	-	-
Alberta	18,286,063	14.03	6
British Columbia	15,028,804	11.53	6
Yukon	-	-	-
Northwest Territories	-	-	-
			42

TABLE 26
CULTURAL INDUSTRIES
PERFORMING ARTS
REVENUE GROUP (\$100k to \$1m-1)
\$37,285,229 (16.80%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	758,562	2.03	3
Prince Edward Island	-	-	-
Nova Scotia	1,338,635	3.59	3
New Brunswick	-	-	-
Quebec	4,996,318	13.40	12
Ontario	14,810,352	39.72	39
Manitoba	2,813,281	7.55	5
Saskatchewan	2,990,540	8.02	5
Alberta	4,191,071	11.24	11
British Columbia	5,386,470	14.45	16
Yukon	-	-	-
Northwest Territories	-	-	-
			94

TABLE 27
CULTURAL INDUSTRIES
PERFORMING ARTS
REVENUE GROUP (>\$100k)
\$89,440 (0.04%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	-	-	-
Manitoba	89,440	100.00	1
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
			1

TABLE 28
CULTURAL INDUSTRIES
PERFORMING ARTS
TOTAL REVENUES BY PROVINCE
 \$221,995,848

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	758,562	.34	3	-
Prince Edward Island	3,317,383	1.49	1	-
Nova Scotia	2,723,667	1.23	4	-
New Brunswick	1,210,664	.55	1	-
Quebec	31,525,568	14.20	21	230
Ontario	92,816,437	41.81	56	805
Manitoba	12,760,619	5.75	9	-
Saskatchewan	22,990,540	10.36	6	250
Alberta	33,477,134	15.08	18	360
British Columbia	20,415,274	9.20	22	-
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
			141	1,645

TABLE 29
CULTURAL INDUSTRIES
PERFORMING ARTS
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND & LABRADOR

758,562 (0.34%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	758,562	100.00	3
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr style="width: 50px; margin: 0 auto;"/> 3

PRINCE EDWARD ISLAND

3,317,383 (1.49%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	3,317,383	100.00	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr style="width: 50px; margin: 0 auto;"/> 1

NOVA SCOTIA

\$2,723,667 (1.23%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	1,385,032	50.85	1
\$100k to \$1m-1	1,338,635	49.15	3
>\$100k	-	-	-
			<hr style="width: 50px; margin: 0 auto;"/> 4

NEW BRUNSWICK

\$1,210,664 (0.55%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	1,210,664	100.00	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr style="width: 50px; margin: 0 auto;"/> 1

TABLE 30
CULTURAL INDUSTRY
VISUAL ARTS
1983-1984 - CANADA
\$101,877,978

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms Establishments
\$10m+	26,177,922	25.69	2
\$1m to \$10m-1	64,533,546	63.69	21
\$100k to \$1m-1	10,916,253	10.83	33
>\$100k	250,258	.25	3
			59

6.4.2 Visual Arts

Statistical material for tables 30 to 36 is derived from the Council for Business and the Arts in Canada (CBAC) Survey of public art galleries and museums. Total revenues for this subsector were \$101.9 million for 1983-1984. As with the performing arts, visual arts firms show a large proportion of concentration with only 2 firms (3 percent) accounting for close to 26 percent of total revenues earned by the whole industry subsector. The following 35 percent (21 firms) generated upwards of \$64.5 million representing almost 64 percent of total revenues. The largest group of 33 firms, or 56 percent in the next revenue group, had only 10.8 percent of the revenues with \$10.1 million, and combined with the three firms (5 percent) earning less than \$100K, had 11 percent of the total revenues with \$11.1 million. Overall, 50 percent of firms are concentrated in Ontario and together generated almost \$50 million or 48 percent of total revenues. Alberta was the next closest with 9 firms (15.25 percent) generating 14.4 percent of total revenues at \$12.4 million. In descending order, Quebec was next with 6 firms (10 percent) and \$9.7 million (approximately 10 percent); British Columbia also with 6 firms and \$8 million (8.6 percent); Manitoba, 2 firms (3 percent) and \$7.5 million (7.5 percent); Nova Scotia, 4 firms (6 percent) earning almost \$6 million (6 percent of total revenues); Saskatchewan, also with 4 firms and \$5.4 million (5 percent), and New Brunswick, also with 4 firms and just over \$1.9 million (2 percent). Newfoundland and Labrador with 2 firms and Prince Edward Island with 1 firm generated \$1.3 million (1.3 percent) and \$139K (.15 percent), respectively.

TABLE 31
CULTURAL INDUSTRY
VISUAL ARTS
REVENUE GROUP (\$10mil+)
 \$26,177,922 (25.69%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	26,177,922	100.00	2
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
			2

TABLE 32
CULTURAL INDUSTRY
VISUAL ARTS
REVENUE GROUP (\$1m to \$10m-1)
 \$64,533,546 (63.23%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	5,208,730	-	1
New Brunswick	1,229,338	1.91	1
Quebec	8,694,420	13.49	3
Ontario	19,094,519	29.63	5
Manitoba	7,554,975	11.72	3
Saskatchewan	5,444,043	8.45	4
Alberta	1,114,110	20.78	3
British Columbia	6,166,421	5.94	2
Yukon	-	-	-
Northwest Territories	-	-	-
			21

TABLE 33
CULTURAL INDUSTRY
VISUAL ARTS
REVENUES GROUP (\$100k to \$1m-1)
\$10,916,253 (10.83%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	1,325,030	12.00	2
Prince Edward Island	139,190	1.26	1
Nova Scotia	778,962	8.19	3
New Brunswick	613,303	5.55	3
Quebec	1,034,069	9.37	3
Ontario	3,901,005	35.33	12
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	1,282,739	11.62	6
British Columbia	1,841,955	16.68	3
Yukon	-	-	-
Northwest Territories	-	-	-
			33

TABLE 34
CULTURAL INDUSTRY
VISUAL ARTS
REVENUES GROUP (>\$100k)
\$2,502,58 (0.25%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	182,163	72.79	2
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	68,095	27.21	1
Yukon	-	-	-
Northwest Territories	-	-	-
			3

TABLE 35
CULTURAL INDUSTRY
VISUAL ARTS
TOTAL REVENUES BY PROVINCE
 \$101,877,979

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	1,325,030	1.30	2
Prince Edward Island	139,190	.14	1
Nova Scotia	5,987,692	6.00	4
New Brunswick	1,842,641	1.81	4
Quebec	9,728,489	9.55	6
Ontario	49,355,609	48.43	21
Manitoba	7,554,975	7.41	2
Saskatchewan	5,444,043	5.34	4
Alberta	12,423,839	14.40	9
British Columbia	8,076,471	8.63	6
Yukon	-	-	-
Northwest Territories	-	-	-
			59

TABLE 36
CULTURAL INDUSTRY
VISUAL ARTS
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND

\$1,325,030 (1.30%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	1,325,030	100.00	2
>\$100k	-	-	-
			2

PRINCE EDWARD ISLAND

\$1,391,90 (.14%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to 1m-1	-	-	-
\$100k to 1m-1	1,391,90	100.00	1
>\$100k	-	-	-
			1

NOVA SCOTIA

\$5,987,692 (6.00%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to 10m-1	5,208,730	85.21	1
\$100k to 1m-1	778,962	14.79	3
>\$100k	-	-	-
			4

NEW BRUNSWICK

\$1,842,641 (1.81%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to 10m-1	1,229,338	66.72	1
\$100k to 1m-1	613,303	33.28	3
>\$100k	-	-	-
			4

QUEBEC
\$9,728,489 (9.55%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	8,694,420	89.37	3
\$100k to \$1m-1	1,034,069	10.63	3
>\$100k	-	-	-
			6

ONTARIO
\$49,355,609 (48.43%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	26,177,922	53.04	2
\$1m to 1m-1	19,094,519	38.69	5
\$100k to 1m-1	3,901,005	7.90	12
>\$100k	182,163	0.37	2
			21

MANITOBA
\$7,554,975 (7.41%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to 10m-1	7,554,975	100.00	2
\$100k to 1m-1	-	-	0
>\$100k	-	-	-
			2

SASKATCHEWAN
\$5,444,043 (5.34%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to 10m-1	5,444,043	100.00	4
\$100k to 1m-1	-	-	3
>\$100k	-	-	-
			4

ALBERTA

\$12,423,839 (14.40%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	11,141,100	91.26	3
\$100k to \$1m-1	1,282,739	8.74	6
>\$100k	-	-	-
			<hr/>
			9

BRITISH COLUMBIA

\$8,076,471 (5.63%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to 1m-1	6,166,421	66.70	2
\$100k to 1m-1	1,841,955	32.11	3
>\$100k	68,095	1.19	1
			<hr/>
			6

YUKON

0.0 (0.00%)

NORTHWEST TERRITORIES

0.0 (0.00%)

TABLE 37
CULTURAL INDUSTRIES
FILM AND VIDEO
1983-1984 - CANADA
TOTAL REVENUES
\$921,170,000

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	859,100,000	93.26	15
\$1m to \$10m-1	62,070,000	6.74	28
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			43

6.4.3 Film and Video

As table 37 indicates, the film and video industry does not involve many small-scale operations. In fact, out of 43 firms there were none with revenues of less than \$1 million. A good 35 percent of firms (15) shared \$859 million among them representing a sizeable 93 percent of total revenues. In contrast to this, 65 percent of the remaining firms (28) shared \$62 million among themselves representing a diminitive 7 percent of total revenues. Here again, geographical concentration is evident where the largest 10 firms (67 percent) earn approximately 70 percent of the revenues in this \$10m group. While in the next group (\$1m to \$10m-1) Manitoba has a 60 percent share of the firms, this group only represents 1.3 percent of total revenues for the industry, that is, \$12 million compared to Ontario's \$606 million (66 percent) earned by its 12 firms. Dwarfed by this showing are Quebec with 1 firm generating \$139.9 million or 15 percent; British Columbia with 6 firms, \$115.7 million (13 percent); Alberta, 4 firms, \$44.2 million, 4.8 percent; and New Brunswick with 1 firm generating \$3 million in revenues or .33 percent of total revenues for the film and video industry subsector. It should be noted that the provinces of Newfoundland and Labrador, Prince Edward Island, and Nova Scotia are recorded as having no film and video companies.

TABLE 38
CULTURAL INDUSTRIES
FILM AND VIDEO
REVENUE GROUP (\$10m+)
\$859,100,000 (96.35%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	133,400,000	15.53	2
Ontario	595,700,000	69.34	10
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	30,000,000	3.49	1
British Columbia	100,000,000	11.64	2
Yukon	-	-	-
Northwest Territories	-	-	-
			15

TABLE 39
CULTURAL INDUSTRIES
FILM AND VIDEO
REVENUE GROUP (\$1m to \$10m-1)
\$62,070,000 (6.74%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	3,000,000	4.83	1
Quebec	6,500,000	10.47	1
Ontario	10,570,000	17.03	2
Manitoba	12,000,000	19.33	17
Saskatchewan	-	-	-
Alberta	14,240,000	22.94	3
British Columbia	15,760,000	25.39	4
Yukon	-	-	-
Northwest Territories	-	-	-
			28

TABLE 40
CULTURAL INDUSTRIES
FILM AND VIDEO
1983-1984 - CANADA
TOTAL REVENUES BY PROVINCE
\$921,170,000

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	-	-	-	-
Prince Edward Island	-	-	-	-
Nova Scotia	-	-	-	-
New Brunswick	3,000,000	.33	1	150
Quebec	139,900,000	15.19	3	1,564
Ontario	606,270,000	65.82	12	8,098
Manitoba	12,000,000	1.30	17	39*
Saskatchewan	-	-	-	-
Alberta	44,240,000	4.80	4	650
British Columbia	115,760,000	12.57	6	3,050
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
			43	13,551

* Estimate.

**TABLE 41
CULTURAL INDUSTRIES
FILM AND VIDEO
REVENUE GROUP BY PROVINCE**

NEWFOUNDLAND & LABRADOR

0.0 (0.00%)

PRINCE EDWARD ISLAND

0.0 (0.00%)

NOVA SCOTIA

0.0 (0.00%)

NEW BRUNSWICK

\$3,000,000 (0.33%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$100k to \$1m-1	3,000,000	100.00	1
\$1m to \$10m-1	-	-	-
>\$100k	-	-	-
			1

QUEBEC

\$139,900,000 (15.19%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	133,400,000	95.35	2
\$1m to \$10m-1	6,500,000	4.65	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			3

ONTARIO

\$606,270,000 (65.82%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	595,700,000	98.26	10
\$1m to \$10m-1	10,570,000	1.74	2
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			12

MANITOBA

\$12,000,000 (1.30%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	12,000,000	100.00	17
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/> 17

SASKATCHEWAN

0.0 (0.00%)

ALBERTA

\$44,240,000 (4.80%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	30,000,000	67.81	1
\$1m to \$10m-1	14,240,000	32.19	3
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/> 4

BRITISH COLUMBIA

\$155,760,000 (12.57%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	100,000,000	86.39	2
\$1m to \$10m-1	15,760,000	13.61	4
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/> 6

YUKON

0.0 (0.00%)

NORTHWEST TERRITORIES

0.0 (0.00%)

TABLE 42
BOOK PUBLISHING
1983-1984 - CANADA
\$1,748,108,000

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	1,670,300,000	95.55	31
\$1m to \$10m-1	63,630,000	3.64	19
\$100k to \$1m-1	13,128,000	.75	34
>\$100k	1,050,000	.06	21
			105

6.4.4 Book Publishing

Revenues from book publishing in 1983-1984 totalled \$1.7 billion. Table 42 shows a fairly even distribution of the total 105 firms in each revenue group. However, approximately 30 percent of all firms represent 96 percent of total industry revenues. Or, conversely, 70 percent of all firms (74) earned 4.5 percent of total industry revenues. Distribution by province (Table 47) shows a marked concentration of more and larger firms in Ontario; where 40 percent of all firms earned 76 percent (\$1.3 billion) of all revenues. This compares with Manitoba, characterized by a large number of small companies, earning just under 3 percent (\$44 million) of total revenues and Quebec with 11 percent of firms in the industry sharing a significant 20 percent (\$337 million) of total revenues. The remaining 18 firms shared among themselves just over 2 percent (\$41 million) of the revenues. As will be evident from the tables on the three publishing industries, the Yukon and Northwest Territories record no firms.

TABLE 43
BOOK PUBLISHING
REVENUE GROUP (\$10m+)
 \$1,670,300,000 (95.55%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	331,110,000	19.82	5
Ontario	1,278,200,000	76.53	23
Manitoba	31,000,000	1.86	2
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	30,000,000	1.80	1
Yukon	-	-	-
Northwest Territories	-	-	-
			31

TABLE 44
BOOK PUBLISHING
REVENUE GROUP (\$1m to \$10m-1)
 \$63,630,000 (3.74%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	1,900,000	2.99	1
New Brunswick	-	-	-
Quebec	4,800,000	7.54	3
Ontario	43,530,000	68.41	9
Manitoba	7,700,000	12.10	3
Saskatchewan	1,900,000	2.99	1
Alberta	1,900,000	2.99	1
British Columbia	1,900,000	2.99	1
Yukon	-	-	-
Northwest Territories	-	-	-
			19

TABLE 45
BOOK PUBLISHING
REVENUE GROUP (\$100k to \$1m-1)
\$13,128,000 (0.75%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	290,000	2.21	1
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	290,000	2.21	1
Quebec	1,330,000	10.13	3
Ontario	2,708,000	20.63	6
Manitoba	5,560,000	42.35	16
Saskatchewan	870,000	6.63	3
Alberta	1,040,000	7.92	2
British Columbia	1,040,000	7.92	2
Yukon	-	-	-
Northwest Territories	-	-	-
			34

TABLE 46
BOOK PUBLISHING
REVENUE GROUP (>\$100k)
\$1,050,000 (0.06%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	65,000	6.19	1
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	12,500	1.19	1
Ontario	142,500	13.57	3
Manitoba	635,000	60.48	13
Saskatchewan	65,000	6.19	1
Alberta	65,000	6.19	1
British Columbia	65,000	6.19	1
Yukon	-	-	-
Northwest Territories	-	-	-
			21

TABLE 47
BOOK PUBLISHING
TOTAL REVENUES
 \$1,748,108,000

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	290,000	.02	1	7
Prince Edward Island	65,000	.003	1	2
Nova Scotia	1,900,000	.11	1	15
New Brunswick	290,000	.02	1	15
Quebec	337,242,500	19.29	12	5,418
Ontario	1,324,580,500	75.77	41	10,726
Manitoba	44,895,000	2.57	34	709
Saskatchewan	2,835,000	.16	5	50
Alberta	3,005,000	.17	4	46
British Columbia	33,005,000	1.89	5	371
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
			105	17,359

TABLE 48
BOOK PUBLISHING
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND & LABRADOR

\$290,000 (0.02%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	290,000	100.00	1
>\$100k	-	-	-
			1

PRINCE EDWARD ISLAND

\$65,000 (0.00%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	-	-	-
>\$100k	65,000	100.00	1
			1

NOVA SCOTIA

\$1,900,000 (0.11%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	1,900,000	100.00	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			1

NEW BRUNSWICK
\$290,000 (0.02%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	290,000	-	1
>\$100k	-	-	-
			1

QUEBEC
\$337,242,500 (19.29%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	331,100,000	98.18	4
\$1m to \$10m-1	4,800,000	1.42	3
\$100k to \$1m-1	1,330,000	.39	3
>\$100k	12,500	-	1
			11

ONTARIO
\$1,324,580,500 (75.77%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	1,278,200,000	96.50	23
\$1m to \$10m-1	43,530,000	3.29	9
\$100k to \$1m-1	2,708,000	.20	6
>\$100k	142,500	.01	3
			41

MANITOBA
\$44,895,000 (2.57%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	31,000,000	69.05	2
\$1m to \$10m-1	7,700,000	17.15	3
\$100k to \$1m-1	5,560,000	12.38	16
>\$100k	635,000	1.41	13
			34

SASKATCHEWAN

\$2,835,000 (0.16%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	1,900,000	67.02	1
\$100k to \$1m-1	870,000	30.69	3
>\$100k	65,000	2.29	1
			<hr/>
			5

ALBERTA

\$3,005,000 (0.17%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	1,900,000	63.23	1
\$100k to \$1m-1	1,040,000	34.61	2
>\$100k	65,000	2.16	1
			<hr/>
			4

BRITISH COLUMBIA

\$33,005,000 (1.89%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	30,000,000	90.90	1
\$1m to \$10m-1	1,900,000	5.76	1
\$100k to \$1m-1	1,040,000	3.15	2
>\$100k	65,000	.20	1
			<hr/>
			5

YUKON

0.0 (0.00%)

NORTHWEST TERRITORIES

0.0 (0.00%)

TABLE 49
NEWSPAPER PUBLISHING
1984 MARKET - CANADA
 \$5,087,062,500

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	4,998,300,000	98.26	30
\$1m to \$10m-1	72,140,000	1.42	24
\$100k to \$1m-1	15,740,000	.31	37
>\$100k	882,500	.02	16
			107

6.4.5 Newspaper Publishing

Comparatively to all cultural industry subsectors, the newspaper publishing industry generated a hefty \$5 billion in revenues in the 1983-1984 period. While Table 49 also indicates a fairly even distribution of the 107 firms comprising this industry, the level of concentration is very high with 28 percent of all firms controlling in excess of 98 percent of the industry's total revenues. Here again, Ontario dominates the industry with 20 firms (or 18 percent) controlling 85 percent (\$4.3 billion) of industry revenues and 13 of these 20 firms representing 86 percent of revenues by firms in the top revenue group (Table 50). Manitoba had the largest number of small companies in the industry. However, the 46 firms in this province accounted for only 4.9 percent of total revenues for the industry (Table 54).

TABLE 50
NEWSPAPER PUBLISHING
REVENUE GROUP (\$10m+)
\$4,998,300,000 (98.26%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	354,000,000	7.08	4
Ontario	4,303,000,000	86.09	13
Manitoba	72,500,000	1.45	4
Saskatchewan	46,000,000	.92	3
Alberta	98,000,000	1.96	4
British Columbia	124,800,000	2.50	2
Yukon	-	-	-
Northwest Territories	-	-	-
			<hr/> 30

TABLE 51
NEWSPAPER PUBLISHING
REVENUE GROUP (\$1m to \$10m-1)
\$72,140,000 (1.42%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	1,900,000	2.63	1
Prince Edward Island	-	-	-
Nova Scotia	1,900,000	2.63	1
New Brunswick	8,500,000	11.78	2
Quebec	8,090,000	11.21	2
Ontario	20,930,000	29.01	6
Manitoba	15,300,000	21.21	7
Saskatchewan	3,800,000	5.27	2
Alberta	2,820,000	3.91	1
British Columbia	8,900,000	12.34	0
Yukon	-	-	-
Northwest Territories	-	-	-
			<hr/> 34

TABLE 52
NEWSPAPER PUBLISHING
REVENUE GROUP (\$100k to \$1m-1)
 \$15,740,000 (0.31%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	750,000	4.76	1
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	-	-	-
Manitoba	9,140,000	58.07	22
Saskatchewan	1,620,000	10.29	4
Alberta	3,530,000	22.43	9
British Columbia	700,000	4.45	1
Yukon	-	-	-
Northwest Territories	-	-	-
			37

TABLE 53
NEWSPAPER PUBLISHING
REVENUE GROUP (>\$100k)
 \$882,500 (0.02%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	65,000	7.37	1
Manitoba	687,500	77.90	13
Saskatchewan	65,000	7.37	1
Alberta	65,000	7.37	1
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
			16

TABLE 54
NEWSPAPER PUBLISHING
TOTAL REVENUES
\$5,087,062,500

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	1,900,000	.04	1	75
Prince Edward Island	-	-	-	-
Nova Scotia	2,650,000	.05	2	70
New Brunswick	8,500,000	.17	2	241
Quebec	362,090,000	7.12	6	4,460
Ontario	4,323,995,000	85.00	20	57,694
Manitoba	97,627,500	1.92	46	1,309
Saskatchewan	51,485,000	1.01	10	948
Alberta	104,415,000	2.05	15	774
British Columbia	134,400,000	2.64	5	1,840
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
			107	67,411

TABLE 55
NEWSPAPER PUBLISHING
BY REVENUE GROUP BY PROVINCE

NEWFOUNDLAND & LABRADOR

\$1,900,000 (0.04%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	1,900,000	100.00	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			1

PRINCE EDWARD ISLAND

0.0 (0.00%)

NOVA SCOTIA

\$2,650,000 (0.05%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	1,900,000	71.70	1
\$100k to \$1m-1	750,000	28.30	1
>\$100k	-	-	-
			2

NEW BRUNSWICK

\$8,500,000 (0.17%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	8,500,000	100.00	2
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			2

QUEBEC

\$362,090,000 (7.12%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	354,000,000	97.77	4
\$1m to \$10m-1	8,090,000	2.23	2
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/> 4

ONTARIO

\$4,323,995,000 (80.00%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	4,303,000,000	99.51	13
\$1m to \$10m-1	20,930,000	.48	6
\$100k to \$1m-1	-	-	-
>\$100k	65,000	-	1
			<hr/> 20

MANITOBA

\$97,627,500 (1.92%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	72,500,000	74.26	4
\$1m to \$10m-1	15,300,000	15.67	7
\$100k to \$1m-1	9,140,000	9.36	22
>\$100k	687,500	.70	13
			<hr/> 46

SASKATCHEWAN

\$51,485,000 (1.01%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	46,000,000	89.35	3
\$1m to \$10m-1	3,800,000	7.38	2
\$100k to \$1m-1	1,620,000	3.15	4
>\$100k	65,000	.13	1
			<hr/> 10

ALBERTA
\$104,415,000 (2.05%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	98,000	93.86	4
\$1m to \$10m-1	2,820,000	2.70	1
\$100k to \$1m-1	3,530,000	3.38	9
>\$100k	65,000	.06	1
			<hr/> 15

BRITISH COLUMBIA
\$134,400,000 (2.64%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	124,800,000	92.86	2
\$1m to \$10m-1	8,900,000	6.62	2
\$100k to \$1m-1	700,000	0.52	1
>\$100k	-	-	-
			<hr/> 5

YUKON
0.0 (0.00%)

NORTHWEST TERRITORIES
0.0 (0.00%)

TABLE 56
PERIODICAL PUBLISHING
1983-1984 MARKET - CANADA
\$238,182,500

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	196,700,000	82.58	8
\$1m to \$10m-1	35,850,000	15.05	10
\$100k to \$1m-1	5,490,000	2.30	11
>\$100k	142,500	.06	3
			32

6.4.6 Periodical Publishing

The periodical publishing industry in 1983-1984 realized revenues of \$238 million. The firms recorded in this assessment number a conservative 32. Overall concentration in the industry is evident with 8 firms (25 percent) accounting for \$196.7 million of total revenues or 83 percent. Provincially, Ontario accounts for 66 percent of industry revenues with 8 firms of which 5 have combined revenues of \$155.7 million (Table 57). Manitoba and British Columbia also represent significant proportions (21 percent and 10 percent respectively) of total industry revenues, with British Columbia generating its revenues (\$24.7 million) from 3 large firms while 13 firms accounted for Manitoba's \$49.2 million in revenues (Table 61).

TABLE 57
PERIODICAL PUBLISHING
REVENUE GROUP (\$10m+)
 \$196,700,000 (82.58%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	155,700,000	83.40	5
Manitoba	31,000,000	16.60	2
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	10,000,000	-	1
Yukon	-	-	-
Northwest Territories	-	-	-
			8

TABLE 58
PERIODICAL PUBLISHING
REVENUE GROUP (\$1m to \$10m-1)
 \$35,850,000 (15.05)%

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	1,900,000	8.98	1
Manitoba	15,450,000	73.05	5
Saskatchewan	3,800,000	17.97	2
Alberta	-	-	-
British Columbia	14,700,000	-	2
Yukon	-	-	-
Northwest Territories	-	-	-
			10

TABLE 59
PERIODICAL PUBLISHING
REVENUE GROUP (\$100k to \$1m-1)
 \$5,490,000 (2.30%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	290,000	5.28	1
New Brunswick	-	-	-
Quebec	750,000	13.66	1
Ontario	290,000	5.28	1
Manitoba	2,830,000	51.55	5
Saskatchewan	-	-	-
Alberta	1,330,000	24.23	3
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
			11

TABLE 60
PERIODICAL PUBLISHING
REVENUE GROUP (>\$100k)
 \$142,500 (0.06%)

Province	Total Revenues	% o Total Revnues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	65,000	45.61	1
Manitoba	12,500	8.77	1
Saskatchewan	-	-	-
Alberta	65,000	45.61	1
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
			3

TABLE 61
PERIODICAL PUBLISHING
TOTAL REVENUES
\$238,182,500

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	-	-	-	-
Prince Edward Island	-	-	-	-
Nova Scotia	290,000	.12	1	15
New Brunswick	-	-	-	-
Quebec	750,000	.31	1	35
Ontario	157,955,000	66.32	8	2,206
Manitoba	49,292,500	20.70	13	687
Saskatchewan	3,800,000	1.60	2	44
Alberta	1,395,000	.59	4	33
British Columbia	24,700,000	10.37	-	174
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
			30	5,094

**TABLE 62
PERIODICAL PUBLISHING
BY REVENUE GROUP PROVINCE**

NEWFOUNDLAND & LABRADOR

0.0 (0.00%)

PRINCE EDWARD ISLAND

0.0 (0.00%)

NOVA SCOTIA

\$290,000 (0.12%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	290,000	100.00	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			1

NEW BRUNSWICK

0.0 (0.00%)

QUEBEC

\$750,000 (00.31%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	750,000	100.00	1
>\$100k	-	-	-
			1

ONTARIO

\$157,955,000 (66.32%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	155,700,000	98.57	5
\$1m to \$10m-1	1,900,000	1.20	1
\$100k to \$1m-1	290,000	.18	1
>\$100k	65,000	.04	1
			8

MANITOBA

\$49,292,400 (20.70%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	31,000,000	62.89	2
\$1m to \$10m-1	15,450,000	31.34	5
\$100k to \$1m-1	2,840,000	5.74	5
>\$100k	12,500	.03	1
			<hr/>
			13

SASKATCHEWAN

\$3,800,000 (1.60%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	3,800,000	100.00	2
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/>
			2

ALBERTA

\$1,395,000 (0.59%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	1,330,000	95.34	3
>\$100k	65,000	4.66	1
			<hr/>
			4

BRITISH COLUMBIA

\$24,700,000 (10.37%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	10,000,000	40.49	1
\$1m to \$10m-1	14,700,000	59.51	2
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/>
			3

YUKON

0.0 (0.00%)

NORTHWEST TERRITORIES

0.0 (0.00%)

TABLE 63
INFORMATICS INDUSTRY
SOFTWARE AND SERVICE BUREAUX
1983-1984 - CANADA
\$18,904,923,937 (36.68%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	18,214,753,502	96.35	122
\$1m to \$10m-1	624,410,435	3.30	142
\$100k to \$1m-1	65,760,000	.35	130
>\$100k	-	-	2
			396

6.5 Informatics Industries: Statistical Highlights

The software and service bureaux industry group generated gross revenues of almost \$19 billion, or 36.6 percent of gross revenues for the communications sector as a whole. The revenue curve is skewed dramatically in favour of the top 120 companies. These companies comprise only 30 percent of the industry group but generated over 96 percent of the revenues for the year. Just over 3 percent of the revenues were earned by 36 percent of the firms, while a lower end of the curve, some 33 percent of the firms generated only .35% of the revenue.

In looking at the statistics from a regional perspective, Ontario dominated in revenues earned, (\$15.6 billion or over 82 percent) and the number of firms (233 or 59 percent). However, Quebec had 7,775 employees in the industry group as opposed to 4,408 in Ontario. Quebec, however, had only 63 firms and these firms earned only 6.4 percent of the total revenues.

Alberta was marginally ahead of Quebec in total revenues with 6.6 percent of the market, but well below Quebec in both the number of firms (33) and the number of employees (2931). Manitoba, with only 8 firms earning just over 2 percent of the revenues, had 5,206 employees, or 24 percent of the industry group total.

Prince Edward Island, the Yukon and Northwest Territories were not represented in the statistics.

TABLE 64
INFORMATICS INDUSTRY
SOFTWARE AND SERVICE BUREAUX
REVENUE GROUP (\$10m+)
 \$18,214,753,502 (96.35%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	11,000,000	.06	1
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	1,078,383,000	5.92	15
Ontario	15,205,085,383	83.48	85
Manitoba	415,500,000	2.28	3
Saskatchewan	103,917,063	.57	4
Alberta	1,176,359,056	6.46	7
British Columbia	212,509,000	1.17	6
Yukon	-	-	-
Northwest Territories	-	-	-
			121

TABLE 65
INFORMATICS INDUSTRY
SOFTWARE AND SERVICES BUREAUX
REVENUE GROUP (\$1m to \$10m-1)
 \$624,410,435 (3.30%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	2,900,000	.46	1
Prince Edward Island	-	-	-
Nova Scotia	7,942,000	1.27	2
New Brunswick	-	-	-
Quebec	119,810,000	19.19	25
Ontario	372,636,658	59.68	88
Manitoba	12,968,000	2.08	2
Saskatchewan	7,950,000	1.27	2
Alberta	68,050,600	10.90	14
British Columbia	32,153,177	5.15	8
Yukon	-	-	-
Northwest Territories	-	-	-
			142

TABLE 66
INFORMATICS INDUSTRY
SOFTWARE AND SERVICE BUREAUX
REVENUE GROUP (\$100k to \$1m-1)
 \$65,760,000 (0.35%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	1,000,000	1.52	2
Prince Edward Island	-	-	-
Nova Scotia	4,000,000	6.08	8
New Brunswick	500,000	.76	1
Quebec	11,500,000	17.49	23
Ontario	29,760,000	45.26	58
Manitoba	1,500,000	2.28	3
Saskatchewan	500,000	.76	1
Alberta	6,500,000	9.88	13
British Columbia	10,500,000	15.97	21
Yukon	-	-	-
Northwest Territories	-	-	-
			130

TABLE 67
INFORMATICS INDUSTRY
SOFTWARE AND SERVICE BUREAUX
TOTAL REVENUE BY PROVINCE
 \$18,904,923,937

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	14,900,000	.08	4	31
Prince Edward Island	-	-	-	-
Nova Scotia	11,942,000	.06	10	32
New Brunswick	500,000	-	1	8
Quebec	1,209,693,000	6.40	63	7,775
Ontario	15,607,482,041	82.56	233	4,408
Manitoba	429,968,000	2.27	8	5,206
Saskatchewan	112,367,063	.59	7	19
Alberta	1,250,909,656	6.62	34	2,931
British Columbia	255,162,177	1.35	35	1,219
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
			395	21,629

TABLE 68
INFORMATICS INDUSTRY
SOFTWARE AND SERVICE BUREAUX
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND & LABRADOR

\$14,900,000 (0.08%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	11,000,000	73.83	1
\$1m to \$10m-1	2,900,000	19.46	1
\$100k to \$1m-1	1,000,000	6.71	2
>\$100k	-	-	-
			4

PRINCE EDWARD ISLAND

0.0 (0.00%)

NOVA SCOTIA

\$11,942,000 (0.06%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	7,942,000	66.50	2
\$100k to \$1m-1	4,000,000	33.50	8
>\$100k	-	-	-
			1

NEW BRUNSWICK

\$500,000 (0.00%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	500,000	100.00	1
>\$100k	-	-	-
			1

QUEBEC

\$1,209,693,000 (6.40%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	1,078,383,000	89.15	15
\$1m to \$10m-1	119,810,000	9.90	25
\$100k to \$1m-1	11,500,000	.95	23
>\$100k	-	-	-
			<hr/> 63

ONTARIO

\$15,607,482,041 (82.56%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	15,205,085,383	97.42	82
\$1m to \$10m-1	372,636,658	2.39	88
\$100k to \$1m-1	29,760,000	.19	58
>\$100k	-	-	2
			<hr/> 230

MANITOBA

\$429,968,000 (2.27%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	415,500,000	96.64	3
\$1m to \$10m-1	12,968,000	3.02	2
\$100k to \$1m-1	1,500,000	.35	3
>\$100k	-	-	-
			<hr/> 8

SASKATCHEWAN

\$112,367,063 (0.59%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	103,917,063	92.48	4
\$1m to \$10m-1	7,950,000	7.08	2
\$100k to \$1m-1	500,000	.44	1
>\$100k	-	-	-
			<hr/> 7

ALBERTA

\$1,250,909,656 (6.62%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	1,176,359,056	94.04	6
\$1m to \$10m-1	68,050,600	5.44	14
\$100k to \$1m-1	6,500,000	.52	13
>\$100k	-	-	-
			<hr/>
			33

BRITISH COLUMBIA

\$255,162,177 (1.35%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	212,509,000	83.28	5
\$1m to \$10m-1	32,153,177	12.60	8
\$100k to \$1m-1	10,500,000	4.12	21
>\$100k	-	-	-
			<hr/>
			34

YUKON

0.0 (0.00%)

NORTHWEST TERRITORIES

0.0 (0.00%)

TABLE 69
SPACE INDUSTRY
1983-1984 - CANADA
 \$294,985,174

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	234,630,000	79.54	6
\$1m to \$10m-1	54,094,500	18.34	13
\$100k to \$1m-1	6,090,674	2.06	17
>\$100k	170,000	.06	4
			40

6.6 Space Industries: Statistical Highlights

6.6.1 Domestic Market

According to the MOSST Survey of Space Industry Sales, there were 40 companies directly and partially involved in the Canadian space industry. These companies comprise equipment designers, manufacturers, and testers; software developers; service suppliers and consultants.

The 40 companies had 1983 revenues in excess of \$294.9 million. The top six companies (15 percent) generated revenues of \$234.6 million, 79.54 percent of total revenues for the industry. The following 34 companies, who comprise the majority of the industries, earned a minimal 20.46 percent of the total revenues for the 1983-1984 period. Four of the top 6 firms are located in Ontario with one firm in each of the provinces of Quebec and British Columbia. It is significant to note that the one Quebec firm earned 45.61 percent of the revenues generated by the top 6 while the 4 Ontario firms accounted for 48 percent and the B.C. firm earned the remaining 6.39 percent; an excess of 70 percent over individual Ontario firms and 85 percent above the B.C. firms. The revenue curve is skewed dramatically in favor of the few top firms in the industry. (Note that the Quebec firms, and the one Ontario firm which accounts for 42 percent of the \$112.6 million revenues in that province, are the Quebec and Ontario divisions of the same company. Combined revenues, therefore, for this firm represents 65.80 percent (\$154.3 million) of overall revenues within that revenues group.)

(Text continued on page 141)

TABLE 70
SPACE INDUSTRY
REVENUE GROUP (\$10m+)
 \$234,630,000 (79.54%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	107,010,000	45.61	1
Ontario	112,620,000	48.00	4
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	15,000,000	6.39	1
Yukon	-	-	-
Northwest Territories	-	-	-
			6

TABLE 21
SPACE INDUSTRY
REVENUE GROUP (\$1m to \$10m-1)
 \$54,094,500 (18.34%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	6,800,000	12.57	1
Ontario	30,248,000	55.92	9
Manitoba	6,817,000	12.60	1
Saskatchewan	7,024,500	12.99	1
Alberta	-	-	-
British Columbia	3,205,000	5.92	1
Yukon	-	-	-
Northwest Territories	-	-	-
			13

TABLE 72
SPACE INDUSTRY
REVENUE GROUP (\$100k to \$1m-1)
 \$6,090,674 (2.06%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	750,000	12.31	2
Ontario	4,887,000	80.24	13
Manitoba	-	-	-
Saskatchewan	353,674	5.81	1
Alberta	-	-	-
British Columbia	100,000	1.64	1
Yukon	-	-	-
Northwest Territories	-	-	-
			17

TABLE 73
SPACE INDUSTRY
REVENUE GROUP (>\$100k)
 \$170,000 (.06%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	170,000	100.00	3
Manitoba	-	-	-
Saskatchewan	0	-	1
Alberta	-	-	-
British Columbia	-	-	-
Yukon	-	-	-
Northwest Territories	-	-	-
			4

TABLE 74
SPACE INDUSTRY
TOTAL REVENUES BY PROVINCE
 \$294,985,174

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	-	-	-	
Prince Edward Island	-	-	-	
Nova Scotia	-	-	-	
New Brunswick	-	-	-	
Quebec	114,560,000	38.84	4	822
Ontario	147,925,000	50.15	29	1,593
Manitoba	6,817,000	2.31	1	96
Saskatchewan	7,378,174	2.50	3	177
Alberta	-	-	-	
British Columbia	18,305,000	6.21	3	361
Yukon	-	-	-	
Northwest Territories	-	-	-	
			40	3,049

Thirteen companies, or 32.5 percent of the total industry group, had revenues in the \$1 million to \$10 million revenue group and accounted for 18.34 percent (slightly over \$54 million) of the total. Within this revenue group, firms in Ontario earned over \$30.2 million, representing 55.92 percent of the revenue group earnings, single firms in each of four provinces earned \$7 million plus (12.99 percent) in Saskatchewan, \$6.8 million plus (12.60 percent) in Manitoba, \$6.8 million (12.57 percent) in Quebec, and \$3.2 million (5.92 percent) in British Columbia.

Seven firms (roughly 42 percent) were at the lower end of the 1983-1984 revenue curve with sales of \$6 million, representing 2.06 percent of total industry revenues. Within this revenue group, Ontario had 13 firms, combined earnings of \$4.8 million (80.24 percent), Quebec had 2 firms, combined earnings of \$750 thousand (12.31 percent), Saskatchewan and B.C. each with one firm, combined earnings of \$453 thousand plus and 7.45 percent of total group revenues. Of the 4 companies with revenues of less than \$100 thousand, three are located in Ontario and one in Saskatchewan. However, 2 of the 4 companies in this revenue group, both located in Ontario, reported no earnings.

The distribution of space industry firms by province, finds Ontario with the lion's share with 29 companies, 72.50 percent of

(Text continued on page 144)

**TABLE 75
SPACE INDUSTRY
REVENUES GROUPED BY PROVINCES**

NEWFOUNDLAND & LABRADOR

0.0 (0.00%)

PRINCE EDWARD ISLAND

0.0 (0.00%)

NOVA SCOTIA

0.0 (0.00%)

NEW BRUNSWICK

0.0 (0.00%)

QUEBEC

\$114,560,000

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	107,010,000	93.41	1
\$1m to \$10m-1	6,800,000	5.94	1
\$100k to \$1m-1	750,000	.65	2
>\$100k	-	-	-
			<hr/> 4

ONTARIO

\$147,925,000

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	112,620,000	76.13	4
\$1m to \$10m-1	30,248,000	20.45	9
\$100k to \$1m-1	4,887,000	3.30	13
>\$100k	170,000	.11	3
			<hr/> 29

MANITOBA

\$6,817,000

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	6,817,000	100.00	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/>
			1

SASKATCHEWAN

\$7,378,174

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	7,024,500	95.21	1
\$100k to \$1m-1	353,674	4.79	1
>\$100k	0	-	1
			<hr/>
			3

ALBERTA

0.0 (0.00%)

BRITISH COLUMBIA

\$18,305.000

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	15,000,000	81.94	1
\$1m to \$10m-1	3,205,000	17.51	1
\$100k to \$1m-1	100,000	.55	1
>\$100k	-	-	-
			<hr/>
			3

YUKON

0.0 (0.00%)

NORTHWEST TERRITORIES

0.0 (0.00%)

TABLE 76
SPACE INDUSTRY - EXPORTS
1983-1984 - CANADA
 \$184,229,500 (62.45%)

Revenue Group	Total Revenues	% of Total Export Revenues	% of Domestic Revenues	No. of Firms
\$10m+	162,313,000	88.10	69.18	6
\$1m to \$10m-1	20,782,500	11.28	38.42	10
\$100k to \$1m-1	1,134,000	.62	18.62	5
>\$100k	-	-	-	-
				21

the overall total of 40 firms. The relative size of these firms is, however, indicated by the fact that they earned only 50.15 percent of the industry revenues for 1983. Quebec, on the other hand, although being the home of only 10 percent (4) of the firms, accounted for over 38 percent of total revenues. The ratio of firms to revenue was about even in British Columbia (7.5% to 6.21%) and Manitoba (2.5% to 2.31%). Saskatchewan, although having 7.5 of the firms, accounted for only 2.5 percent of the industry revenues. It should also be noted that in the 1983-1984 period there were no space industry firms located in the Atlantic provinces, Alberta or the Yukon and Northwest Territories.

The manpower distribution in the space industry, that is, permanent, temporary and contract personnel directly engaged in space activities, is roughly proportional to the revenue distribution: Quebec, 822 employees (26.96 percent); Ontario, 1,593 (52.25 percent); Manitoba, 96 (3.15 percent); Saskatchewan, 177 (5.81 percent); and British Columbia with 361 employed or 11.84 percent.

6.6.2 Foreign Market

The 21 firms with export sales represented a majority of firms conducting business outside of Canada. Foreign market sales in the space industry represents 62.45 percent (\$184.2 million) of the total industry revenues. While the same pattern of a few large firms earning the bulk of revenues is still evident, of significance is the good export performance overall of the medium and smaller size firms in the industry. Firms earning less than \$10 million had

(Text continued on page 147)

TABLE 77
SPACE INDUSTRY - EXPORTS
REVENUE GROUP (\$10m+)
 \$162,313,000 (88.10%)

Province	Total Revenues	% of Total Export Revenues	% of Domestic Revenues	No. of Firms
Newfoundland & Labrador	-	-	-	-
Prince Edward Island	-	-	-	-
Nova Scotia	-	-	-	-
New Brunswick	-	-	-	-
Quebec	83,267,000	51.30	77.81	1
Ontario	70,046,000	43.15	62.20	4
Manitoba	-	-	-	-
Saskatchewan	-	-	-	-
Alberta	-	-	-	-
British Columbia	9,000,000	5.54	60.00	1
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
				6

TABLE 78
SPACE INDUSTRY - EXPORTS
REVENUE GROUP (\$1m to \$10m-1)
 \$20,782,500 (11.28%)

Province	Total Revenues	% of Total Export Revenues	% of Domestic Revenues	No. of Firms
Newfoundland & Labrador	-	-	-	-
Prince Edward Island	-	-	-	-
Nova Scotia	-	-	-	-
New Brunswick	-	-	-	-
Quebec	-	-	-	-
Ontario	11,670,000	56.15	38.58	8
Manitoba	4,461,000	21.47	65.44	1
Saskatchewan	4,651,500	22.38	66.21	1
Alberta	-	-	-	-
British Columbia	-	-	-	-
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
				10

TABLE 79
SPACE INDUSTRY - EXPORTS
REVENUE GROUP (\$100k to \$1m-1)
 \$1,134,000 (.62%)

Province	Total Revenues	% of Total Export Revenues	% of Domestic Revenues	No. of Firms
Newfoundland & Labrador	-	-	-	-
Prince Edward Island	-	-	-	-
Nova Scotia	-	-	-	-
New Brunswick	-	-	-	-
Quebec	50,000	4.41	6.67	1
Ontario	1,034,000	91.18	21.16	3
Manitoba	-	-	-	-
Saskatchewan	-	-	-	-
Alberta	-	-	-	-
British Columbia	50,000	4.41	50.00	1
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
				5

TABLE 80
SPACE INDUSTRY - EXPORTS
TOTAL REVENUES BY PROVINCE
 \$184,229,500

Province	Total Revenues	% of Total Export Revenues	% of Domestic Revenues	No. of Firms
Newfoundland & Labrador	-	-	-	-
Prince Edward Island	-	-	-	-
Nova Scotia	-	-	-	-
New Brunswick	-	-	-	-
Quebec	83,317,000	45.22	72.73	2
Ontario	82,750,000	44.92	55.94	15
Manitoba	4,461,000	2.42	65.44	1
Saskatchewan	4,651,000	2.52	63.04	1
Alberta	-	-	-	-
British Columbia	9,050,000	4.91	49.44	2
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
				21

export sales representing, on average, 56.74 percent of their overall earnings; for firms earning above \$10 million, the percentage was 66.67. Export sales of firms earning less than \$1 million involves, for example, a B.C. consulting firm exporting 50 percent of its expertise compared to a Quebec firm exporting 6.67 percent of its products. Despite such wide interplay between companies in the provinces having players in the industry, average export sales of 61.32 percent are a promising indicator of Canadian Export growth in the space market on the world scene.

TABLE 81
COMMUNICATIONS INDUSTRY MANUFACTURING*
1983-1984 MARKET - CANADA
 \$11,555,411,500

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	10,669,427,000	92.33	206
\$1m to \$10m-1	727,967,000	6.30	267
\$100k to \$1m-1	150,585,000	1.30	343
>\$100k	7,342,500	.06	222
			1,038

*Includes Telecommunications, Cable and Broadcasting, Space and Informatics (hardware) Manufacturing.

6.7 Communications Industry Manufacturing: Statistical Highlights

In fiscal year 1983-1984 there were 1,038 firms in Canada engaged in manufacturing products for the communications industry. Total revenues attributable to this industry amounted to \$11.5 billion. Just over 92 percent (\$10.6 billion) of the total revenue was earned by only 19.8 percent (206) of the firms in the industry. The gap between these top firms (i.e., those with revenue of \$10 million or more) and firms below that level is wide, with only 7.7 percent of the overall revenues earned by the remaining 832 firms. Approximately 25.7 percent, or 267 firms, generated revenues in the \$1 million to \$10 million range and 33 percent (343 firms) had revenues in the range of \$100 thousand to \$1 million. The balance of roughly 22 percent (222) firms earned only .06 percent (\$7.3 million) of the industry revenues.

The total number of industry employees was 75,731 for the year with Ontario well out in front with 41,629 or almost 55 percent of the total. Quebec had 12,470 (16.5%), followed by Alberta with 8,377 (11.06%) and British Columbia with 5,964 (7.87%).

In looking at the geographical distribution of firms, by far the largest majority, 456 firms or 44 percent of the total were located in Ontario. Closest to Ontario was British Columbia with 126 firms (12%) Quebec with 116 (11%) and Alberta with 113 firms (10.8%). All other provinces and territories each had less than 7 percent of the industry firms.

Ontario also dominated the industry revenue picture with a 72.75 percent (\$8 billion) share of the total--some \$7.2 billion more than Quebec firms with revenues of \$1.18 billion. Revenues for the

other provinces ranged downward from 916 million in Alberta to \$1 million in the Yukon. Also, the vast majority (74%) of firms with revenues of \$10 million or more were located in Ontario, but 8 other provinces had some representation in this category. Only Prince Edward Island, the Yukon and Northwest Territories were excluded.

It is significant to note that, in examining the distribution of employees, firms and revenues by province, there was a higher ratio of employees to revenue and firms to revenue in all provinces and territories except Ontario. For example, Nova Scotia had 2.25 percent of the employees, 3.85 percent of the firms, but only .89 percent of revenues. Comparable figures for Manitoba were 2.57, 6.07 and 1.55 percent, and for British Columbia were 7.87, 12.14 and 5.15 percent. Ontario, on the other hand, had 54.96 percent of the employees, 43.93 percent of the firms, but earned 72.75 percent of the industry revenues.

TABLE 82
COMMUNICATIONS INDUSTRY MANUFACTURING
REVENUE GROUP (\$10m+)
 \$727,967,000 (92.33%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	31,000,000	.29	2
Prince Edward Island	-	-	-
Nova Scotia	81,000,000	.76	3
New Brunswick	15,500,000	.15	1
Quebec	1,083,935,000	10.16	26
Ontario	7,898,236,000	74.03	132
Manitoba	146,000,000	1.37	8
Saskatchewan	77,500,000	.73	5
Alberta	835,538,000	7.83	14
British Columbia	500,718,000	4.69	15
Yukon	-	-	-
Northwest Territories	-	-	-
			206

TABLE 83
COMMUNICATIONS MANUFACTURING
REVENUE GROUP (\$1m to \$10m-1)
 \$727,967,000 (6.30%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	7,950,000	1.09	1
Prince Edward Island	-	-	-
Nova Scotia	15,400,000	2.12	6
New Brunswick	5,300,000	.73	3
Quebec	80,152,000	11.01	32
Ontario	443,615,000	60.94	159
Manitoba	21,100,000	2.90	9
Saskatchewan	22,200,000	3.05	8
Alberta	61,900,000	8.50	22
British Columbia	70,350,000	9.66	27
Yukon	-	-	-
Northwest Territories	-	-	-
			267

TABLE 84
COMMUNICATIONS INDUSTRY MANUFACTURING
REVENUE GROUP (\$100k to \$1m-1)
\$150,585,000 (1.30%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	2,200,000	1.46	6
Prince Edward Island	1,160,000	.77	4
Nova Scotia	6,040,000	4.01	18
New Brunswick	1,450,000	.96	5
Quebec	17,460,000	11.59	34
Ontario	63,765,000	42.34	134
Manitoba	11,270,000	7.48	23
Saskatchewan	4,110,000	2.73	12
Alberta	17,730,000	11.77	47
British Columbia	22,620,000	15.02	52
Yukon	870,000	.58	3
Northwest Territories	1,910,000	1.27	5
			343

TABLE 85
COMMUNICATIONS INDUSTRY MANUFACTURING
REVENUE GROUP (>\$100k)
\$7,432,500 (0.06%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	517,500	6.96	12
Prince Edward Island	332,500	4.47	14
Nova Scotia	517,500	6.96	13
New Brunswick	425,000	5.72	13
Quebec	760,000	10.23	24
Ontario	882,500	11.87	31
Manitoba	792,500	10.66	23
Saskatchewan	540,000	7.27	18
Alberta	1,205,000	16.21	30
British Columbia	1,100,000	14.80	32
Yukon	167,500	2.25	5
Northwest Territories	192,500	2.59	7
			222

TABLE 86
COMMUNICATIONS INDUSTRY MANUFACTURING
TOTAL REVENUES
\$11,555,411,500

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	41,667,500	.36	21	582
Prince Edward Island	1,492,500	.01	18	130
Nova Scotia	102,957,500	.89	40	1,703
New Brunswick	22,675,000	.20	22	556
Quebec	1,182,307,000	10.23	116	12,470
Ontario	8,406,498,500	72.75	456	41,629
Manitoba	179,162,500	1.55	63	1,950
Saskatchewan	104,350,000	.90	43	2,061
Alberta	916,373,000	7.93	113	8,377
British Columbia	594,788,000	5.15	126	5,964
Yukon	1,037,500	.01	8	250
Northwest Territories	2,102,500	.02	12	59
			1,038	75,731

TABLE 87
COMMUNICATIONS INDUSTRY MANUFACTURING
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND & LABRADOR

\$41,667,500 (0.36%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	31,000,000	74.40	2
\$1m to \$10m-1	7,950,000	19.08	1
\$100k to \$1m-1	2,200,000	5.28	6
>\$100k	517,500	1.24	12
			<hr/> 21

PRINCE EDWARD ISLAND

\$1,492,500 (0.01%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	1,160,000	77.72	4
>\$100k	332,500	22.28	14
			<hr/> 18

NOVA SCOTIA

\$102,957,500 (0.89%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	81,000,000	78.67	3
\$1m to \$10m-1	15,400,000	14.96	6
\$100k to \$1m-1	6,040,000	5.87	18
>\$100k	517,500	.50	13
			<hr/> 40

NEW BRUNSWICK

\$22,675,000 (0.20%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	15,500,000	68.36	1
\$1m to \$10m-1	5,300,000	23.37	3
\$100k to \$1m-1	1,450,000	6.39	5
>\$100k	425,000	1.87	13
			<hr/> 22

QUEBEC

\$1,182,307,000 (10.23%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	1,083,935,000	91.68	26
\$1m to \$10m-1	80,152,000	6.78	32
\$100k to \$1m-1	17,460,000	1.48	34
>\$100k	760,000	.06	24
			<hr/>
			116

ONTARIO

\$8,406,498,500 (72.75%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	7,898,326,000	93.95	132
\$1m to \$10m-1	443,615,000	5.28	159
\$100k to \$1m-1	63,765,000	.76	134
>\$100k	882,500	.01	31
			<hr/>
			456

MANITOBA

\$179,162,500 (1.55%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	146,000,000	81.49	8
\$1m to \$10m-1	21,100,000	11.78	9
\$100k to \$1m-1	11,270,000	6.29	23
>\$100k	792,500	.44	23
			<hr/>
			63

SASKATCHEWAN

\$104,350,000 (0.90%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	77,500,000	74.27	5
\$1m to \$10m-1	22,200,000	21.27	8
\$100k to \$1m-1	4,110,000	3.94	12
>\$100k	540,000	.52	18
			<hr/>
			43

ALBERTA

\$916,373,000 (7.93%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	835,538,000	91.18	14
\$1m to \$10m-1	61,900,000	6.75	22
\$100k to \$1m-1	17,730,000	1.93	47
>\$100k	1,205,000	.13	30
			<hr/> 113

BRITISH COLUMBIA

\$594,788,000 (5.15%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	500,718,000	84.18	15
\$1m to \$10m-1	70,350,000	11.83	27
\$100k to \$1m-1	22,620,000	3.80	52
>\$100k	1,100,000	.18	32
			<hr/> 126

YUKON

\$1,037,500 (0.01%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	870,000	83.86	3
>\$100k	167,500	16.14	5
			<hr/> 8

NORTHWEST TERRITORIES

\$2,102,500 (0.02%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	1,910,000	90.84	5
>\$100k	192,500	9.16	7
			<hr/> 12

TABLE 88
COMMUNICATIONS INDUSTRY MANUFACTURING EXPORTS
1983-1984 - CANADA
 \$886,235,000 (7.67%)*

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	826,000,000	93.20	29
\$1m to \$10m-1	52,200,000	5.89	18
\$100k to \$1m-1	7,810,000	.88	19
>\$100k	225,000	.03	8
			74

*The figure 7.67 percent is the export percentage of Communications Industry Manufacturing.

6.8 Communications Industry Manufacturing Exports: Statistical Highlights

This subsector of the communications manufacturing industry earned 7.67 percent (\$886 million) of the revenues for the industry as a whole. Of the 1,038 firms (see Table 73) in the overall industry, only 74, or 7.13 percent, were engaged in the export market in the 1983-84 fiscal year.

As in the case of the communications manufacturing industry as a whole, Ontario firms were dominant in the export of manufactured communications products. Some 63.5 percent of the exporting firms were located in that province and these firms earned 79.8 percent of the total export revenues. Closest to Ontario was Quebec, but that province had only 8 percent of the exporting firms and 9.36 percent of the export revenues. British Columbia, although being the location of 16 percent of the firms, generated only 6.5 percent of the total revenues. Four other provinces were each represented by 4 percent or less of the exporting firms. Two provinces, P.E.I. and Newfoundland,* and the two territories were not represented in the industry subsector.

*The provincial industry data is not so readily available; but, as point 4.3 (page 7) and Graph V (page 25 and 26) indicate, Newfoundland has a healthy export market.

TABLE 89
COMMUNICATIONS INDUSTRY MANUFACTURING EXPORTS
REVENUE GROUP (\$10m+)
\$826,000,000 (93.20%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	81,000,000	9.81	3
Ontario	667,500,000	80.81	21
Manitoba	15,500,000	1.88	1
Saskatchewan	15,500,000	1.88	1
Alberta	-	-	-
British Columbia	46,500,000	5.63	3
Yukon	-	-	-
Northwest Territories	-	-	-
			29

TABLE 90
COMMUNICATIONS INDUSTRY MANUFACTURING EXPORTS
REVENUE GROUP (\$1m to \$10m-1)
\$52,200,000 (5.89%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	3,900,000	7.47	1
New Brunswick	-	-	-
Quebec	1,900,000	3.64	1
Ontario	34,800,000	66.67	12
Manitoba	1,900,000	3.64	1
Saskatchewan	-	-	-
Alberta	-	-	-
British Columbia	9,700,000	18.58	3
Yukon	-	-	-
Northwest Territories	-	-	-
			18

TABLE 91
COMMUNICATIONS INDUSTRY MANUFACTURING EXPORTS
REVENUE GROUP (\$100k to \$1m-1)
 \$7,810,000 (0.88%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	290,000	3.71	1
New Brunswick	-	-	-
Quebec	-	-	-
Ontario	5,030,000	64.40	11
Manitoba	-	-	-
Saskatchewan	290,000	3.71	1
Alberta	580,000	7.43	2
British Columbia	1,620,000	20.74	4
Yukon	-	-	-
Northwest Territories	-	-	-
			19

TABLE 92
COMMUNICATIONS INDUSTRY MANUFACTURING EXPORTS
REVENUE GROUP (>\$100k)
 \$225,000 (0.03%)

Province	Total Revenues	% of Total Revenues	No. of Firms
Newfoundland & Labrador	-	-	-
Prince Edward Island	-	-	-
Nova Scotia	-	-	-
New Brunswick	-	-	-
Quebec	25,000	11.11	2
Ontario	100,000	44.44	3
Manitoba	-	-	-
Saskatchewan	-	-	-
Alberta	75,000	33.33	1
British Columbia	25,000	11.11	2
Yukon	-	-	-
Northwest Territories	-	-	-
			8

TABLE 93
COMMUNICATIONS INDUSTRY MANUFACTURING EXPORTS
TOTAL REVENUES
\$886,235,000

Province	Total Revenues	% of Total Revenues	No. of Firms	No. Empl'd
Newfoundland & Labrador	-	-	-	-
Prince Edward Island	-	-	-	-
Nova Scotia	4,190,000	.47	2	-
New Brunswick	-	-	-	-
Quebec	82,925,000	9.36	6	125
Ontario	707,430,000	79.82	47	-
Manitoba	17,400,000	1.96	2	-
Saskatchewan	15,790,000	1.78	2	-
Alberta	655,000	.07	3	-
British Columbia	57,845,000	6.53	12	-
Yukon	-	-	-	-
Northwest Territories	-	-	-	-
			74	125

TABLE 94
COMMUNICATIONS INDUSTRY MANUFACTURING EXPORTS
REVENUE GROUP BY PROVINCE

NEWFOUNDLAND & LABRADOR

0.0 (0.00%)

PRINCE EDWARD ISLAND

0.0 (0.00%)

NOVA SCOTIA

\$4,190,000 (0.47%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	-	-	-
\$1m to \$10m-1	3,900,000	93.08	1
\$100k to \$1m-1	290,000	6.92	1
>\$100k	-	-	-
			2

NEW BRUNSWICK

0.0 (0.00%)

QUEBEC

\$82,925,000 (9.36%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	81,000,000	97.68	3
\$1m to \$10m-1	1,900,000	2.29	1
\$100k to \$1m-1	-	-	-
>\$100k	25,000	.03	2
			6

ONTARIO

\$707,430,000 (79.82%)

Revenue Group	Total Revenues	% of Total Revenues	No. of Firms
\$10m+	667,500,000	94.36	21
\$1m to \$10m-1	34,800,000	4.92	12
\$100k to \$1m-1	5,030,000	.71	11
>\$100k	100,000	.01	3
			47

MANITOBA

\$17,400,000 (1.96%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	15,500,000	89.08	1
\$1m to \$10m-1	1,900,000	10.92	1
\$100k to \$1m-1	-	-	-
>\$100k	-	-	-
			<hr/>
			2

SASKATCHEWAN

\$15,790,000 (1.78%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	15,500,000	98.16	1
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	290,000	1.84	1
>\$100k	-	-	-
			<hr/>
			2

ALBERTA

\$655,000 (0.07%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	-	-	-
\$1m to \$10m-1	-	-	-
\$100k to \$1m-1	580,000	88.55	2
>\$100k	75,000	11.45	1
			<hr/>
			3

BRITISH COLUMBIA

\$57,845,000 (6.53%)

<u>Revenue Group</u>	<u>Total Revenues</u>	<u>% of Total Revenues</u>	<u>No. of Firms</u>
\$10m+	46,500,000	80.39	3
\$1m to \$10m-1	9,700,000	16.77	3
\$100k to \$1m-1	1,620,000	2.80	4
>\$100k	25,000	.04	2
			<hr/>
			12

YUKON

0.0 (0.00%)

NORTHWEST TERRITORIES

0.0 (0.00%)

SOURCES FOR TABLES 1 THRU 94

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7.0 MARKET PROFILE

7.1 Introduction

The section is broken down into four categories for description purposes: Structure, Conduct, Emerging Environment, and International Environment.

It should be borne in the mind that these categories can only be differentiated from each other up to a certain extent.

7.2 Telecommunications

TELECOMMUNICATIONS CARRIERS AND SERVICE PROVIDERS

7.2.1 Structure

Telecommunications carriers and service providers operate in the following markets: voice telephony, public messaging, switched teleprinter and text, data transmission, mobile radio and enhanced services. The major players in these markets are telephone companies, CNCP Telecommunications, cable companies, radio common carriers, Telesat Canada and Teleglobe Canada. As Figure 4 shows, the industry consists of a mixture of private, governmental and joint private governmental corporations and organizations. The current structure of each of the aforementioned markets is described below.

Domestic local and long distance public switched voice services are provided on a monopoly basis by telephone companies operating in their respective regions. The members of Telecom Canada consist of telephone companies enjoying a monopoly position in their respective provinces. The provision of long distance voice service via leased circuits is readily available from CNCP as well as other telephone companies. The result is a monopolistically competitive market. Public message service is provided on a monopoly basis by CNCP.

In Canada, public switched data communications, switched teleprinter services, switched teleprinter/communicating word processor services and private switched and non-switched services including lines leased for program transmission are provided by Telecom Canada members and CNCP. Product differentiation between the services provided by each supplier results in a duopolistic market.

Telesat Canada is the product of Canada's space policy which is directed towards domestic telecommunications. It is the nation's monopoly satellite carrier and is jointly-owned by the federal government and Telecom Canada members. Telesat Canada functions as a carrier's carrier leasing satellite capacity to

FIGURE 2

Telephone and telecommunications carriers and characteristics

Major telephone and telecommunications carriers, by affiliation, ownership, type, regulation, and region, 1983

Company	Affiliation	Ownership	Type of Corporation	Regulation	Principal Territory
Bell Canada	Telecom Canada	Private	BCE-owned	Federal	Ontario, Québec and eastern portion of Northwest Territories
British Columbia Telephone	Telecom Canada	Private	Investor-owned	Federal	British Columbia
CNCP Telecommunications	Telecom Canada	Priv/Pub	Crown Corp/Inv	Federal	Canada
Teleglobe Canada	Telecom Canada***	Public	Crown Corporation	Federal**	International/Overseas
Telesat Canada	Telecom Canada	Priv/Pub	Investor-owned****	Federal	Canada
NorthwesTel	Telecom Canada	Public	CNR-owned	Federal	Western portion of Northwest Territories, Yukon and Northern British Columbia
Terra Nova Telecommunications	Telecom Canada	Public	CNR-owned	Federal	Newfoundland
Alberta Government Telephones	Telecom Canada	Public	Crown Corporation	Provincial	Alberta
Saskatchewan Telecommunications	Telecom Canada	Public	Crown Corporation	Provincial*	Saskatchewan
Manitoba Telephone System	Telecom Canada	Public	Crown Corporation	Provincial	Manitoba
Maritime Telegraph and Telephone	Telecom Canada	Private	Investor-owned	Provincial	Nova Scotia
New Brunswick Telephone	Telecom Canada	Private	Investor-owned	Provincial	New Brunswick
Québec-Téléphone	Telecom Canada	Private	Investor-owned	Provincial	Québec
Newfoundland Telephone	Telecom Canada	Private	Investor-owned	Provincial	Newfoundland
Télébec	Telecom Canada	Private	Investor-owned	Provincial	Québec
Island Telephone	Telecom Canada	Private	Investor-owned	Provincial	Prince Edward Island
Northern Telephone	Telecom Canada	Private	Investor-owned	Provincial	Ontario
edmonton telephones	Telecom Canada	Public	Municipally-owned	Municipal	Edmonton

Telecom Canada = Previously known as TCTS (TransCanada Telephone System).

BCE = Bell Canada Enterprises.

Priv/Pub = Private/Public

Crown Corp/Inv = Crown Corporation/Investor-owned

* Reports to the Provincial Minister of Communications, rather than to a regulatory agency.

** Reports to the Federal Minister of Communications, rather than to the CRTC.

*** Non-voting associate member.

**** An incorporated company owned by the Government of Canada and the major telephone companies.

carriers and broadcast undertakings. The company was originally granted monopoly status in the space segment service area to develop systems design and national standards. It was felt that restricting decision-making in an operating environment subject to rapid technological change to one organization would enable quicker response to developing service requirements.¹

The rest of the Canadian telecommunications carriage and services markets consists of mobile radio and enhanced services. As of July 1, 1985 two types of mobile radio service will be available. The introduction of interconnected cellular mobile radio service will be provided on a duopoly basis by telephone companies and Cantel, a national service provider, as licensed by the Department of Communications. Other mobile and radio paging service are provided on a competitive basis by telephone companies and radio common carriers, particularly in urban areas. Most enhanced services are provided by Telecom Canada members, CNCP and cable companies. However, the convergence of telecommunications and computer technologies is also seeing the provision of certain value-added services by information providers. The market structure for the telecommunications services industry is summarized in Figure 5. Market shares by total operating revenues indicate the two national telecommunications systems operated by Telecom Canada and CNCP represent 90% of the market. Radio common carriers, on the other hand, represent less than 1% of the total market.

The Canadian carrier and service provider industry is, as indicated above, heavily monopolized. The lack of competition is due in large part to public policy which, through regulation, has acted as an artificial barrier to entry.

In part, until recently, competition has been rejected in favor of regulative monopolies because it has been seen as in the public's best interests. The current structure has been shaped by policies based on historical beliefs and objectives. It was assumed that telecommunications services could only be delivered efficiently on a monopoly basis because characteristics of the technology allowed for economies of scope and scale which were exaggerated by the vast size of the country and its widely dispersed population. In return for "protected monopoly" status, the telephone companies are regulated to prohibit discrimination, prevent abuse, keep profits at "reasonable" levels and, purportedly, serve as instruments of social policy. The latter refers to the requirement of telephone companies to provide service in both profitable and unprofitable areas in order to fulfill the social objective of providing "universal

Figure 3

Canadian Telecommunications Services Market Structure (1983)

Suppliers Services	Regional and Local Telco's	CNCP	Telesat	Teleglobe	Cable Companies	Radio Common Carriers	Other Non- Carriers
Voice - real - public switched	RM						
Voice - long distance - public switched	RM			M			
Voice - long distance - leased circuits	RMC	RMC		M			
Data - public switched	RMC	RMC		M			
Data - leased circuits	RMC	RMC		M			
Image - public switched	RM						
Image - leased circuits	RM			M			
Switched teleprinter other	RMC	RMC					
Public Message Service		RM		M			
Mobile Communication	R C/MC					C/MC	
Enhanced Service	R C/MC	R C/MC		M/C	C/MC		C/MC

Note: M = monopoly, RM = regulated monopoly, RMC = regulated monopolistic competition, MC = monopolistic competition, C = competition.

Source: DGTP, Telecommunications Carriage and Services Sectoral Environment Paper, Table 2; McPhail, Thomas L. Alternative Futures for the Canadian Telecommunications Carriage Industry, Table 3.2.

service at reasonable, affordable rates."² This has created a geographical structure of the carriage industry which shows a regional distribution of the number of telephones not unlike that for regional population distribution.³ Therefore, the industry has been insulated from the direct influence of changing market forces such as threats of direct competition for existing services, changing demand, and changing technology.

Recently, the basic premise that the industry is characterized by conditions of natural monopoly has been challenged due to advances in technology that make competition possible. However, the evolution towards increased competition has proceeded at a pace dictated by public policy decisions which have lagged behind technological and market possibilities.⁴ To summarize, the current structure is largely the result of public policy based on historical premises that no longer hold with demands for increased competition being driven by technological change.

7.2.2. Conduct

The behavior of firms in many of the telecommunications carriage and service provider markets is constrained by a complex regulatory structure. Regulation is largely carried out on a company-by-company basis with federally incorporated companies regulated by the Canadian Radio-Television and Telecommunications Commission (CRTC), provincially incorporated companies by provincial regulatory bodies and local companies by municipal governments.*

The regulatory environment finds most telephone companies in Canada following similar pricing principles and rate structures. In general, pricing practices reflect large cross-subsidies from long distance to local subscribers, urban to rural subscribers and from business to residential subscribers. Two major pricing policies are used: rate averaging and value of service pricing which were originally designed to facilitate income redistribution.⁵ For example, flat-rate local revenues do not cover local costs but were designed to encourage telephone usage and provide universal telephone access.

In the provision of data communication services competition between CNCP and telephone companies is based on differences in switching facilities available to users and the sensitivity of rates to access, speed of transmission, volume and

* Refer to Figure 4 for the fragmented regulatory structure of Canadian carriage and service providers.

FIGURE 4

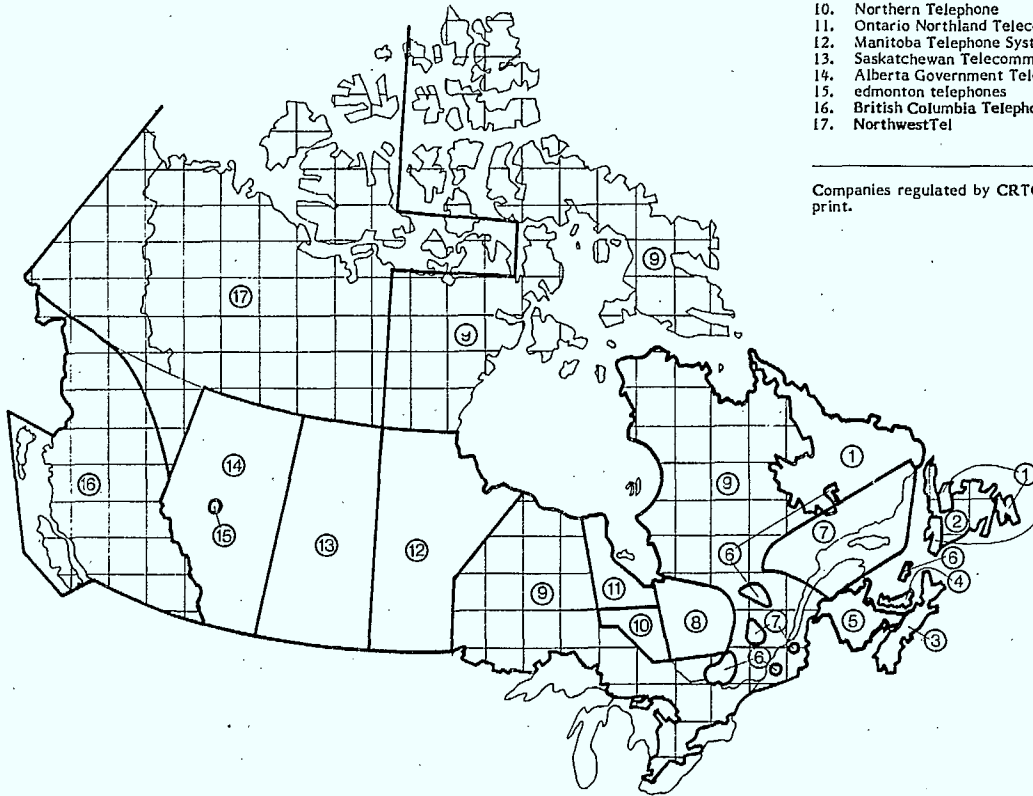
AREAS OF CANADA SERVED BY MAJOR TELEPHONE COMPANIES

Shaded areas show parts of Canada where CRTC-regulated companies provide telephone service.

MAJOR TELEPHONE COMPANIES IN CANADA

1. Newfoundland Telephone Company
2. Terra Nova Telecommunications
3. Maritime Telegraph and Telephone Company
4. The Island Telephone Company
5. The New Brunswick Telephone Company
6. Télébec
7. Québec Téléphone
8. Téléphone du Nord de Québec
9. Bell Canada
10. Northern Telephone
11. Ontario Northland Telecommunications
12. Manitoba Telephone System
13. Saskatchewan Telecommunications
14. Alberta Government Telephones
15. edmonton telephones
16. British Columbia Telephone
17. NorthwestTel

Companies regulated by CRTC appear in bold print.



distance. Price competition between CNCP, Bell Canada and B.C. Tel is controlled by the CRTC. The provision of leased circuits requires the approval of the appropriate regulatory agency. Hence, prices charged by telephone companies and by CNCP are comparable. Telex, offered only by CNCP, dominates the switched teleprinter service market because of its existing infrastructure.

The role of Telesat Canada has, recently, been reviewed with the intent of removing financial support and stability currently provided through its association with Telecom Canada. Although no change has been made, the company's role has been altered due to the liberalization of earth station licensing policy. Since 1979, there have been several amendments to the earth station licensing policy with the trend towards less restriction on who can own and operate transmit/receive earth stations. The CRTC sees Telesat's role changing from one of monopoly provider to that of marketing or encouraging the use of satellite services. Telesat's case for monopoly provision of space segment service contends that Canada has neither the market size nor the resources to encourage competition in this area. Nevertheless, the earth station environment is changing from single operator to multi-operator. The change has necessarily taken a gradual approach due to the initial negative impact on Telesat's financial position because of loss in earth station lease revenue. Lag time in receiving offsetting revenue from leasing transponder capacity has required that changes be kept to a size with which Telesat can cope. Telesat's role is increasingly becoming one of retailing transponder capacity.⁶

Though cable companies primarily distribute television and radio programs, they are diversifying into areas traditionally served by telephone companies; particularly special services such as monitoring fire and burglar alarms. A recent ruling by the CRTC on enhanced services calls for their provision on a competitive basis. Common carriers will be required to provide basic services to value-added carriers for the provision of enhanced services but will be able to provide enhanced services themselves, though on a regulated basis. Common carriers can be expected to restructure service offerings and rates to distinguish between basic and enhanced services. Their ability to compete with unregulated firms in the same market has important policy implications.

Prior to CMR, mobile radio and radio paging services providers were only regulated with respect to spectrum allocation and interconnection. Actually, the telephone company regulator determines or approves the terms of the interconnection between the radio common carrier and the telephone company. Trends towards expansion and systems integration is resulting in an increasing number of joint-ventures and amalgamations as small

firms are being absorbed by larger firms. Such trends require large capital requirements and a high degree of coordination which are prohibitive for small radio common carriers.⁷ New technologies have led to an expansion in the telecommunications sector as a whole. Enhanced services and even the straight reselling of traditional telecommunications services have introduced a new emphasis on retailing--a function historically ignored by the largely monopolistic industry.⁸

The "patch work" nature of telecommunications regulation in Canada has resulted in varying approaches to certain issues and jurisdictional disputes between different levels of regulatory bodies. This has implications on the conduct of companies, i.e., some telephone companies are under financial strain because they are required to serve unprofitable areas. The regulatory system itself is under severe strain. Pressures for increased competition in areas traditionally served by monopolies are making current public policy harder to justify. Competition is increasing not only between firms serving the same market but, more noticeably, a trend towards diversification is seeing competition evolve between firms traditionally operating in different markets. These firms are also competing in markets which had not previously existed. Given the dynamic trend in the industry, the existing regulatory structure, according to the C.I.C.A., "retards innovation, complicates network planning and design, inflates overhead and increases product costs".⁹ Regardless of the direction public policy changes take they will impact on firm conduct and performance.

7.2.3 Emerging Environment

Driven by technological change the existing structure of telecommunications carriage and services markets is being challenged as demand for increased competition is coming from firms who now possess the means to compete in traditionally monopolized areas. For example, extensive broadband distribution systems with bi-directional transmission capabilities is permitting cable companies to diversify from just the delivery of TV and radio programming into general purpose telecommunications services.¹⁰ Long established boundaries that once separated markets within the telecommunications sector are eroding and so are boundaries between the industry and others in the information business. Technological development has resulted in the provision of new services demanded by new markets. Technological innovation has created four basic types of competition that threaten the monopoly position of current carriers and their current pricing policies.

The first threat comes from the ability of a firm to purchase transmission capacity from a facility-owning carrier and to resell that capacity to the end user. For example, the recent

decision to allow CNCP to interconnect local exchange facilities of Bell Canada and B.C. Tel has intensified the rivalry between CNCP and Telecom Canada. Interconnection allows CNCP customers dial access to data and voice service via the public telephone network.

The second threat, related to the first, is that resellers may add enhanced services to the facility-owner's basic transmission capabilities.

Third, new carriers with new facilities may arise to compete directly with established carriers. This recently occurred in transmission by microwave. A decision by the Department of Communications in March 1983 now permits broadcasters and cable operators to apply for licenses to own and operate microwave facilities for the carriage of programming authorized for distribution by the CRTC without the requirement of demonstrating cost and other advantages compared to existing common carrier facilities. Prior to the decision broadcasters and cable operators were dependent on the common carriers for such facilities but are now able to provide their own radio-relay facilities for the carriage of voice and data communication services and for the delivery of regional programming signals. For common carriers the decision has meant lost revenues and increased competition.

Telesat Canada is facing a similar threat in April 1986 when carriers, broadcasters and others will be able to apply for transmit earth station licenses for operation with Canadian satellites for services in Canada. Only transborder services will remain the sole domain of Telesat. Provinces have also expressed strong opposition based on the fact that the policy will allow competitors to operate telecommunications facilities in areas where provincial carriers have had traditional monopolies.¹¹

The fourth threat is the bypass of public networks by privately-owned networks.

Hence, a series of new telecom services and suppliers are emerging which, in general, have no restrictions or conditions placed on their market or economic behavior. Given that some foresee the latter two threats as inevitable, the question of a player's ability to compete fairly arises. In certain markets, economies of scale and scope may exhibit competition. Smaller firms will either be forced to withdraw from the market or merge with larger firms. It is believed an oligopolistic market will inevitably result.¹²

Currently, regulated firms have voiced particular concerns about their ability to compete with added competition. It has become obvious that regulation, which constrains firm's behavior, has not kept pace with technological change. It is further argued that monopoly is no longer necessary in many markets and, in some cases, is even economically inefficient.¹³ With those threats to competition mentioned above, carriers are demanding rate rebalancing so that prices reflect costs. But more importantly, they are demanding that their ability to compete not be hindered.

Two examples of this are Bell Canada's actions with respect to liberalized terminal attachment and with respect to CNCP's application to provide public switched long distance services. Since the mid-1970's steps have been taken to extend terminal attachment to the public telephone networks of the major carriers. Subscribers are given the option of providing their own equipment as an alternative to leasing it from the carrier. Realizing the loss of revenues Bell Canada, in 1979, put forth an application before the CRTC questioning whether such a policy was in the public's interest and if so, to what extent and under what conditions. What has resulted is the ability of carriers to lease and sell terminal equipment with prices subject to CRTC regulation to prevent the subsidization of competitive service with monopoly revenues. Associated tariff changes came into effect in 1984 and included unbundled rates for the primary telephone instrument.¹⁴ Pricing equipment at different rates in different geographical regions has offered carriers greater flexibility in leasing.

Further deregulation is not currently being weighed since the CRTC rejected CNCP's application to compete with Bell Canada in the inter-exchange market. Bell had contended that competition from CNCP and others would have increased local service rates which have been subsidized by long distance revenues. Bell raised the possibility of introducing usage-sensitive pricing at the local level, i.e., local measured service (LMS). The importance of rate rebalancing is to discourage practice of uneconomic bypass of the public telephone network. While economically efficient, such a move would have put in jeopardy the social objective of universal access at "reasonable" rates.

Carriers also indicate that existing regulation prevents them from operating efficiently in today's rapidly changing environment by slowing the adoption rate of new technologies and inhibiting flexibility of response to market demands.¹⁵ General opinion indicates existing regulation is a blunt instrument.¹⁶ According to Dealy, regulation should begin to address society's changing needs not it's past principles.¹⁷

If increased competition is inevitable, then the issue to be addressed by regulation is the manner and timing of further competition.¹⁸ Many are calling for regulatory reform with the emphasis on forming a single national regulatory body.¹⁹

Given that regulation will have impact on the structure of the telecom sector and the conduct and performance of the firms within it, the following possible future market segments have been suggested.²⁰

- Established carriers are expected to continue to exist providing a greater variety of services with greater capacity and capabilities. The eventual entry of new telephone companies is not expected until the turn of the century. The entry of U.S. carriers into the domestic long-distance market is possible with the costs of doing so being only marginal while opportunities to increase market share being considerable.
- With technological advances in their interactive capabilities, cable companies may begin to perceive themselves as alternative common carriers, particularly to satellite transmission. To date, this potential has been unrealized because of marketplace and regulatory uncertainties.
- Radio common carriers with CMR are expected to expand their service to offer both local and long distance services via interconnection with the public switched telephone network or by being completely independent.
- The range of services included in the category of "switched teleprinter and other text" will continue to expand rapidly.
- CNCP's monopoly message service telex will experience declining demand due to increased competition from telephone companies and other electronic mail systems.
- Related to the above, Canada Post is recognized as a possible entrant in the provision of electronic mail services via a privately-operated network.
- A significant regional variability in market structures. For example, the size of the market in Atlantic Canada may still demand that most services be provided on a monopoly basis.²¹

7.2.4 International Environment

International telecommunications services can be separated into overseas traffic and continental traffic.

Teleglobe Canada is a federal crown corporation which provides Canada with telecommunications links overseas. It operates as a monopoly providing interconnect services for voice

data communications (Globedat), facsimile service (Intelpost) and private satellite business services (Globesat) between Canadian carriers and their counterparts overseas. Charges for these services usually consist of two components applied at the call-originating end: national network access charges and international network usage charges based on volume and call duration.

Telecom members have transborder intercarrier agreements with the continental United States telephone companies to provide service to American destinations. Arrangements for transborder satellite traffic have been ongoing between Telesat and U.S. satellite carriers since 1983. Earth stations in Canada, owned by Telesat, are to link up with earth stations in the U.S. via the satellites of either company.

Led by the U.S. there is a trend in North America towards improving industry competitiveness through deregulation.²² This has put the Canadian telecommunications services industry in a precarious position; under pressure to open up competition but unsure of its ability to successfully compete. During the past few years open competition in the U.S. has resulted in aggressive marketing activity and diversified service offerings at vigorous price competition. On the one hand, U.S. firms are looking to expand into new markets, such as Canada, and are ready to compete for them. On the other hand, the ability of Canadian firms to compete in the U.S. is less promising. In sharp contrast to the U.S. telecommunications environment, Canadian markets are still very much closed, highly regulated, lopsided duopolies.²³ Given the existing market structure one tends to conclude that Canadian industry and its regulators are ill-prepared for hard-nosed competition from seasoned U.S. firms.

It is argued that by opening up competition there is no guarantee that the entrants will be Canadian.²⁴ This poses a threat to Canadian sovereignty in the industry. Domestic firms are already facing competition from U.S. firms in the area of long distance service. Canadian subscribers using U.S. provided services are effectively bypassing national long distance systems. Increased competition in the U.S. serves to increase the difference between rates offered there and in Canada. Hence, a firm such as Lonquet can provide cheaper long distance to users in B.C.²⁵ U.S. competition would also threaten Teleglobe's privileged position in the Canadian monopoly for overseas communication by undercutting its prices. As a consequence, ongoing discussions with the U.S. on freeing trade barriers is being met with mixed reviews.²⁶

It is argued that Canada's ability to compete internationally is being undermined by the current regulatory framework.²⁷ It has been suggested the only way to increase

international competitiveness is by first encouraging real competition domestically. It is only after a domestically competitive environment has been established that Canadian firms would be in a position to compete internationally.²⁸ Clearly this argument calls for regulatory reform in the industry.

Despite concerns that the current structure of the industry is constraining domestic firm's abilities to compete internationally, opportunities for Canadian carriers do exist. For example, many smaller countries are indicating the desire to expand and modernize their telecommunications facilities. As operators of one of the best systems in the world, Canadian carriers are in an excellent position to assist such countries. Bell Canada has already received two contracts from Saudi Arabia to provide this service.²⁹

7.2.2 TELECOMMUNICATIONS EQUIPMENT MANUFACTURERS AND SUPPLIERS

7.2.5 Structure

The telecommunications equipment industry is defined to consist of the equipment required by carriers and service providers to construct and operate their systems.

The structure of the Canadian telecommunications equipment industry has been dominated by Northern Telecom and Microtel each of whom is vertically integrated with one of the two largest carriers, Bell Canada and B.C. Tel. Both have their respective research firms, Bell Northern Research for Bell Canada and Microtel Pacific Research Ltd. for B.C. Tel. These two equipment suppliers are the only Canadian manufacturers offering a broad range of equipment. The "major" manufacturers--those with sales greater than \$50 million, accounted for 47% of total industry sales yet, made up only 2% of all establishments. These major manufacturers largely resulted from mergers, amalgamations and outright purchases with a view to rationalizing operations and increasing efficiency and competitiveness. "Medium-sized" manufacturers, those employing more than 100 people but with sales less than \$50 million; made up 13% of all establishments and accounted for 40% of all shipments. These firms tend to offer more specialized product lines and components. "Small" manufacturers employing less than 100 people made up 85% of all establishments yet, only accounted for 12% of total industry shipments.*

Considering the number of establishments, the number of employees, and the number of shipments, the telecommunications equipment industry is concentrated in Ontario, followed by Quebec and British Columbia. These three account for approximately 90%

* Statistics Canada, Catalogue 43-206.

of establishments, employees and shipments in the Canadian telecommunications equipment industry.

In a 1984 Department of Communications survey, two-thirds of medium-sized manufacturers were located in Ontario, one fifth in Quebec and the remainder in Western Canada. Half of those firms surveyed were also subsidiaries of large foreign-owned equipment manufacturers. These subsidiaries depend, to varying degrees, on their parent for product design, research and development. The presence of foreign firms was much less pronounced among small manufacturers as most of them tend to be both Canadian owned and controlled. In general, export sales account for one-third of total revenues. Nearly 50% are located in Ontario, 25% in Quebec, 20% in British Columbia with two manufacturers found in each of the Atlantic and Prairie regions.

The distribution of the Canadian market among suppliers has been determined to a certain extent by the nature of private demand. For example, the majority of Northern Telecom's and Microtel's sales are made to Bell Canada and B.C. Tel, respectively, with neither supplier having to face any real competition from domestic firms. The benefits of Microtel's relationship with B.C. Tel take on even more significance when one considers that Microtel has not been terribly successful in open market sales.³⁰ Furthermore, telephone companies in the Prairies traditionally show preference for suppliers who have manufacturing plants in their operating territories despite the claim they purchase on a competitive basis. Finally, Canadian content provisions affecting Telesat Canada guarantee a certain level of provision from equipment suppliers in the domestic aerospace industry.

In addition to a market environment dominated by two equipment purchasers, new entrants also face high costs of research and development vital for production innovation in a technologically driven, rapidly changing environment. It is difficult for these firms to acquire the sophisticated knowledge and financial resources required to bring new products to market in a timely manner. Although barriers to entry are few, there does exist substantial barriers to growth. Growth requires skills in general management, financial management, technology, production and distribution. Often Canadian companies just starting out rarely possess these skills.³¹

7.2.6 Conduct

Performance in the telecommunications manufacturing industry varies widely due to the highly competitive and highly volatile environment. A relative lack of significant barriers to entry has not only seen a high rate of company entry but also a high rate of company turnover. Constraints on the behavior of

manufacturers do not seem to be a significant issue at the moment. An exception might be Mitel which is upset that the marketing of certain products (e.g., PBX equipment) is frustrated by policies which do not recognize changes in technology.³²

Success in the telecommunications equipment industry is best illustrated by Northern Telecom. The company has evolved from a minor manufacturer which produced equipment for other Canadian markets based on imported technology to a major international manufacturer of sophisticated telecommunications equipment essentially of its own design. It has done this by following specific objectives and strategies. Recently, these objectives and strategies have been founded on two basic observations: The first has been the recognition of the transition of society from one based on industry to one based on information. This change has engendered a conversion to digital networks from analog networks originally designed to carry voice and now being adopted and designed to transmit data and image. Northern Telecom has acted on this by being the first Canadian firm to introduce a full line of digital switching and transmission equipment. The second observation on their part has been to recognize the convergence of communications and computer technologies from which they established an integrated data communications systems operating division. Hence, NT's objectives are:

- 1) vertical integration from the manufacturing of integrated circuits to the design of software, and
- 2) creation of an entire line of digital products.

Its strategies are:

- 1) massive investments in research and development with a view to developing its own integrated circuits and increasing compatibility between a wide range of office automation equipment*, and
- 2) close involvement with its parent company Bell Canada in terms of exchange of information and the use of their networks for product testing.

These strategies have given Northern greater independence, lowered production costs, has enhanced their credibility and has ensured the practical and effective launching of products which are less susceptible to obsolescence.³⁴

* This has been reflected by an increase in R&D expenditures as a percentage of sales from 4.8% in 1975 to 9% in 1984. The company also headed the list of Patentees for Canadian Inventors in 1981.³³

A key to Northern's success has been its ability to increase sales outside of Canada. They recognize that the Canadian market alone cannot absorb the high costs of research and development necessary to maintain the company's position at the forefront of technology.

A recent trend shows that whilst Bell Canada remains Northern's largest customer its importance is declining while foreign sales have increased.³⁵ Strategy now calls for increased exports, the establishment of facilities outside of Canada and the development of co-partnerships.

Other major manufacturers originally have tended to specialize in one equipment category* but offering a wide range of products within that line. For example, 90% of Mitel's sales are PBX equipment, while Gandalf specializes in PBX's. These companies have reached their levels of success by offering high quality products and by exporting a high percentage of their outputs. Their R&D to sales ratio is also high but lower than Northern Telecom's level. Research and development expenditures have focused on the application of new electronic technologies to telecommunications products rather than basic research. This results in both improvements to existing products and to the development of a wider range of products within a line. To become more responsive to new market opportunities some of these companies have moved research and development teams from central laboratories to production facilities.³⁶ As evidenced by Microtel's recent strategy, these major manufacturers alter their behavior based on actions taken by Northern Telecom. Microtel is trying to reduce the extent to which it competes directly with Northern by taking advantage of market niches with new products of its own design and by phasing out the manufacturing of products based on other analog technologies.³⁷

Medium-sized manufacturers tend to specialize in limited product lines offering sophisticated products. Exports are primarily to the U.S. As a group, small manufacturers offer a wide variety of products, components and assemblies for other manufacturers. Given the rapid nature of technological change in the industry, the profitability of smaller and medium-sized firms is low. Profits are absorbed by research and development, marketing and export development expenditures.³⁸ Research and development activity is generally focused on product innovation rather than original product development.

To a large extent success in the industry has depended on identifying and exploiting a market niche resulting from a gap in the product lines of large companies like Northern Telecom.

* One categorization of equipment consists of station apparatus, switching and transmission.

Niche strategies have inherent risks since the niche may only provide a short-term opportunity.³⁹ To reduce this risk a common practice has been the penetration of export markets using narrow product lines in an effort to serve a larger vertical market than is available domestically.⁴⁰

7.2.7 Emerging Environment

Growth in the telecommunications equipment industry depends on the demand for equipment by telecommunications carriers and service providers. Hence, changes in the structure, conduct and performance of the services sector will also determine opportunities for growth for equipment manufacturers and suppliers. To the extent that the recent changes noted in section 7.2.1 lead to the establishment of new telecommunications networks, an expansion to existing networks or to increased purchases by end users, there will be growth in demand for telecommunications equipment.

Future demand by carriers and service providers for equipment will be closely related to the general economic climate, life cycle costs of equipment, adoption of equipment employing new technologies and competition in the areas of traditionally "carrier-provided" services and new services or enhanced services. For example, the Cellular Mobile Radio service will generate a major increase in communications equipment purchases, particularly for manufacturers of switching and transmission equipment.⁴¹ While the above factors will determine growth in the industry as a whole, the distribution of these markets among domestic and foreign suppliers will be determined by, to some extent, the purchasing practices of carriers and other service providers.

Over the short to medium-term it is expected that the sales of telephone exchange switches and PBXs will continue to dominate the Canadian telecommunications equipment market. Firms such as Mitel, which specialize in these product categories, have the greatest growth potential. Certain opportunities will also benefit specific groups of firms (i.e., the introduction of CMR could see the sales of small firms rise appreciably⁴²).

New opportunities for equipment manufacturers will also mean increased competition. The introduction of competition in the carriage industry will have important implications for equipment manufacturers and suppliers. Views are mixed with some of the opinion that competition will provide expanded market opportunities while others believe it will only attract foreign companies with whom small domestic companies could not compete.⁴³ For example, the AT&T divestiture in the U.S. has opened up the lucrative American market to Canadian suppliers providing them with some protection from fluctuations in the

domestic economy. But it has also meant that AT&T is now able to compete elsewhere--including Canada. With its existing infrastructure it would enjoy cost advantages in certain sectors over Canadian counterparts.⁴⁴ Competition is expected to be fierce with regard to prices, quality of products and services with only those companies displaying innovation and excellence surviving. Competition will not only come from foreign sources but also come from domestic firms not traditionally involved with markets served by equipment manufacturers and suppliers. The recent terminal attachment decision rendered by the CRTC has had numerous ramifications including the participation of telecommunications companies in supplying terminal equipment. This type of vertical integration means more competition for equipment manufacturers in a crucial area since sales of telephone sets are estimated at \$300 to \$500 million per year.⁴⁵

Essential factors for success will be the ability of firms to develop and market innovative products on an ongoing basis, and to broaden their product lines in order to be responsive to shifts in market demand.⁴⁶ The first factor reflects trends that are developing which indicate the need for increased commitment to research and development activity. An increasing amount of research and development is being directed at introducing computer-assisted-manufacturing (CAM) and robotics technologies into the manufacturing process. This has improved product quality, product capabilities, reduced manufacturing costs and prolonged product life. The apparent norm for research and development expenditures as a percentage of sales is targeted at 10% for the short-term. The second factor, product line diversification, is a means of reducing the level of risk inherent in a research-and-development intensive industry. Northern Telecom's current strategies employ both of these factors. The company's true strength lies in its research and development activities and this is expected to continue in the coming years as the company will concentrate on developing the OPEN World Concept--its integrated voice, data and image communications network.⁴⁷

These factors apply at the national level as well. It has been suggested that the potential of Canadian technology cannot be developed, nor the domestic market mastered over the long-term, unless Canada's industrial capacity is strengthened and research and development efforts stepped up.⁴⁸

7.2.8 International Environment

The communications equipment segment showed a trade surplus of over \$500 million in 1983. Over half of these foreign shipments were made by Northern Telecom. Other major manufacturers, lead by Mitel, accounted for approximately 20% of

total exports while small and medium-sized firms made up 7%. Despite a growing internationalization in the domestic sector, Canadian manufacturers have seen their share decline in world markets.⁴⁹ Although domestic manufacturers dominate the Canadian market, as a percentage of the world market, it still remains below 4%.

Canada's major trading partner is the U.S. which imported \$200 million more of Canadian telecommunications equipment than it exported to Canada. Japan is also a significant trading partner though Canadian imports outweigh domestic exports. The U.S. market is attractive for the following reasons:⁵⁰

- 1) it is the largest national open market in the world and, since the AT&T divestiture, is open to foreign competition;
- 2) it has similar network standards for telephone systems to that of Canada thereby eliminating the need to modify equipment produced domestically for export; and
- 3) close proximity and similar business methods to that of Canada reduce transportation, marketing and customer support costs.

World market growth is expected to increase by 8-8.5% from 1980-1990.⁵¹ Growth in the U.S. is expected to exceed the world rate slightly but declining rates in other parts of the continent should see the North American market remain stable at about 40%.

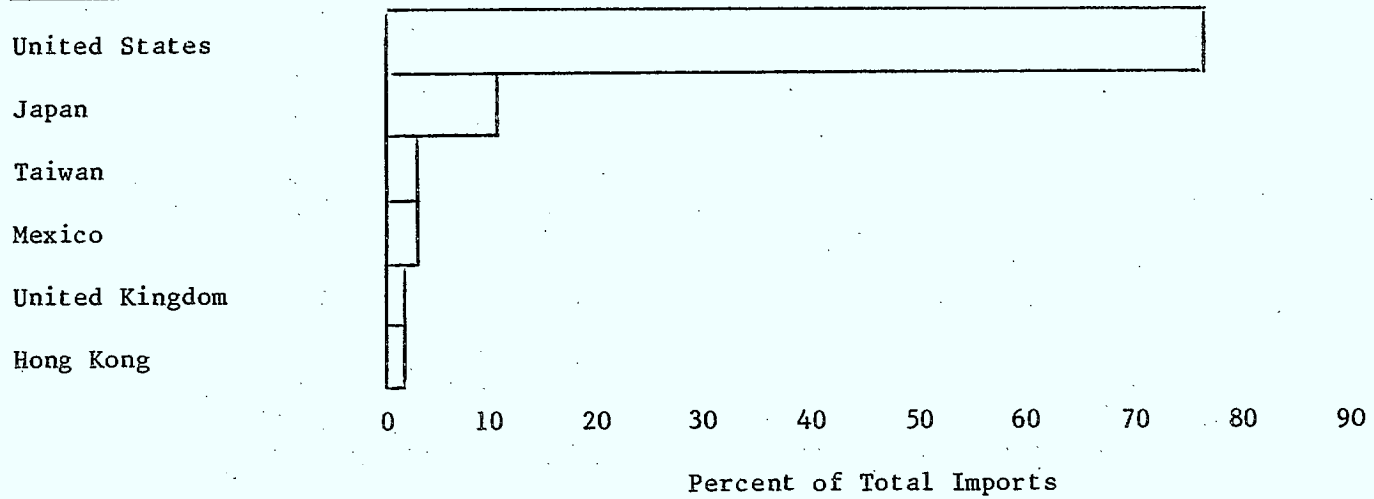
Canadian exports have not fared as well abroad. Success has been limited by technical, economic and political barriers to entry. Asian markets which account for 25% of the world market and which are expected to rise to 30% over the medium term, have typically been closed to outsiders because of numerous barriers to entry for political reasons. With the market expected to grow at an average annual rate of 10% only Japan is showing signs of becoming more accessible. The reorganization of NTT is being considered by the Japanese government which is expected to lead to greater export potential for foreign firms.⁵²

The European market share is 27% but penetration into these markets has been difficult due to differences in technical standards and protectionist trade barriers. Western European nations either have one equipment manufacturer which ranks as a giant on the world scene or relationships between governments, telephone companies and manufacturers are so close that foreign firms can hardly hope to make significant inroads. Eastern Europe has only been attainable to foreign manufacturers via technology transfer or joint-manufacturing agreements. Europe's share of the market is expected to drop to 24%. One opportunity may be the British market which is showing signs of opening up to foreign competition with the privatization of British Telecom.⁵³

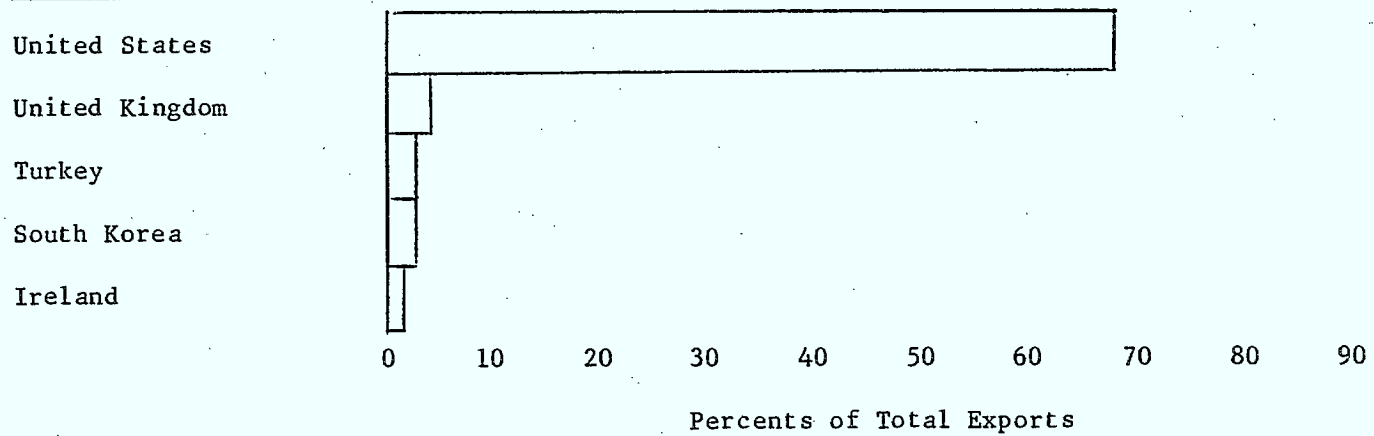
FIGURE 5

CANADIAN TRADING PARTNERS IN TELECOM EQUIPMENT AND COMPONENTS, 1983

Imports



Exports



*Source: Canada Consulting based on Statistics Canada

Markets in Latin America, Oceania and Africa are expected to remain stable in relative terms but are still small at 3%, 2% and 1%, respectively. Less Developed Countries insist on local manufacturing and research by multinationals as a means of industry development and technology transfer.⁵⁴

In terms of products, 60% of the world demand will be for switching and transmission equipment while less than 15% will be for terminal equipment. It is interesting to note that Northern Telecom's product mix closely resembles the global market breakdown for telecommunications equipment.⁵⁵

General trends on the international scene are emphasizing the importance of research and development, purchase financing, political factors and the type of market penetration. The latter refers to the increasing importance that is being attached to investment in domestic manufacturing either directly or in conjunction with foreign capital.⁵⁶

Success in the medium term will depend on the industry's ability to penetrate export markets to capture the volume of sales required to recover the substantial outlays for research and development. Past-growth exhibited by major domestic manufacturers is primarily a result of foreign sales.⁵⁷ This requires human, technological and financial resources. In this respect, service providers play a key role through traditional vertical relationships by providing R&D or R&D financing to equipment manufacturers. Other key factors to foreign market penetration will be the development and operation of manufacturing facilities in principal markets and marketing and after-sales service. Northern Telecom's huge lead via other domestic manufacturers is attributed to its own numerous plants being located outside of Canada.⁵⁸

The future of the Canadian telecommunications equipment industry will depend on building on the strengths which currently exists (that is R&D effort focussed on digital switching technologies). For small firms and new entrants to be successful will require that they confine themselves to offering narrow product lines or serving specialized vertical markets.⁵⁹ Large domestic companies face the challenge of maintaining the technological competitiveness of their product line since on the world scene they are not large players.

FOOTNOTES

1. DGTP, Telecommunications Carriage and Services-Sectoral Environment Paper, July 15, 1984, p. 43.
2. Thomas L. McPhail, Alternative Futures: The Canadian Telecommunications Carriage Industry 1985-2000, March 1985, p. 1 (commissioned by The Telecom Policy Branch, DOC.)
3. Mcphail, Figure 9, p. 24.
4. McPhail, p. 61.
5. Rate averaging is where all customers pay the same rate for the same class of service. Value of service pricing sets rates that vary based on the value of service to the subscriber. See also McPhail, p. 33.
6. DGTP, Environmental Paper, p. 46.
7. Ontario Regional Office, DOC, Canadian Communications Sector: Ontario Economic Assessment, 1984, p. 28.
8. McPhail, p. 86.
9. McPhail, p. 25
10. DGTP, Environmental Paper, p. 11.
11. Ibid., p. 47.
12. McPhail, p. 28.
13. McPhail, p. 61.
14. DGTP, Environmental Paper, p. 39.
15. McPhail, p. 65.
16. McPhail, p. 64.
17. John F. Dealy, "Telecommunications: Policy Issues and Options for the 1980's", The Brookings Review, 1:2, Winter 1982, p. 31.
18. DGTP, Preliminary Review of Submisssions Received in Response to Canada Gazette Notice No. DGTN-001-84, June 25, 1984, p. 9.
19. DGTP, Environmental Paper, p. 47.
20. McPhail, pp. 37-42.

21. DGTP, Gazette p. 2.
22. Ontario Regional Office, DOC, p. 23.
23. McPhail, p. 96.
24. McPhail, p. 95.
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28. McPhail, p. 102.
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37. Ibid., p. 26.
38. Ontario Regional Office, DOC., p. 24.
39. Price Waterhouse Associates, p. 31.
40. Ibid.
41. DOC, Economic Development Division, p. 17.
42. Ibid., p. 105.
43. Ontario Regional Office, DOC, p.24.
44. McPhail, pp. 28-29.

45. DOC, Economic Development Division, p. 18.
46. Price Waterhouse Associates, p. 22.
47. DOC, Economic Development Division, p. 40.
48. Guy Ara et al., The World Telecommunications Market, Vol. 1, Ottawa: University of Ottawa; 1983, p. 71.
49. Ibid., p. 11.
50. Price Waterhouse Associates, p. 23.
51. Guy Ara et al., p. 21.
52. Price Waterhouse Associates, p. 24.
53. Ibid., p. 20.
54. Canada Consulting Group Inc., Communications Strategic Situation, July 23, 1984, p. 23.
55. Ibid., p. 20.
56. Guy Ara et al., p. 107.
57. DOC, Economic Development Division, p. 102.
58. Ibid., p. 30.
59. Price Waterhouse Associates, p. 35.

7.3 Broadcasting and Cable

The industry subsector consists of the following groups: service providers (these include radio and television broadcasters and cable television broadcasters), the Canadian Broadcasting Corporation and also broadcasting equipment manufacturers and equipment suppliers which are treated under section 7.3.12.

RADIO AND TELEVISION BROADCASTING AND SERVICE PROVIDERS

7.3.1 Structure

The Canadian radio and television broadcasting subsector is comprised of a mixture of public and private enterprises. A discussion of the interplay of the broadcasting and cable sector with that of the telecommunications sector is found under point 7.2.3.

Table 13 (p. 64) illustrated the distribution of firms and revenues by province. The same information grouped by region allocates the percentage of firms and of revenues (the number in parentheses) as follows: Atlantic, 13.29 (5.56); Quebec, 23.43 (21.24); Ontario, 26.92 (42.94); Central, 19.93 (21.08); and Pacific, 16.43 (9.20). As an aside, the regrouped revenue data shows that Ontario generates twice (compared to Quebec) to as much as seven times (compared to the Atlantic provinces) the revenues generated by other regions. CRTC figures for all licensed undertakings, most of which are not yet in operation, illustrates the future distribution of radio and television firms: Atlantic, 18.04; Quebec, 17.63; Ontario, 16.97, Prairie, 22.63; and Pacific, 24.74.* Broadcasting license requirements and regulations are, to a great extent, therefore, the determinant of the industry structure.

A further analysis of revenue data for the radio and broadcasting industry shows that the major revenue earners are located in large markets and tend to be Multi-System Operators (MSOs) located within these larger markets. In contrast to these MSOs, radio stations in small markets are dependent on local advertising revenues which are sensitive to economic downturns.¹ The profit curve for radio stations is skewed in favor of those in larger markets. In 1983, for example, the top 40 radio stations accounted for 13 percent of the profits for the sector. In fact, only 40 percent of all radio stations had

* CRTC, Facts Digest on Broadcasting and Telecommunications in Canada, January 1984.

profits in 1983, whereas 60 percent of the stations suffered losses.

7.3.2 Conduct

The Canadian broadcasting industry is the focus of entertainment in this country. In the course of providing entertainment broadcasting to Canadians, however, the industry sells audience exposure to commercial messages. Firms in both radio and television broadcasting engage in audience and price competition.

Revenues from the sale of air time (advertising) by the combined radio and television industry amounted to \$1.5 billion in 1984, up by 15.4 percent over the previous year. Radio broadcasters in the private sector earned \$544 million while private television broadcasters earned \$816.6 million. Local air time sales on private radio and television combined were \$593 million and national sales were \$618.9 million. Network time sales accounted for a further \$149.3 million in revenue. All figures were up over air time sales in 1983. Production and other revenue to private stations amounted to \$97.3 million.

In considering expenses for private stations in 1984, programming took the largest share with \$585 million. Cost of sales and promotion took \$203.9 million, while administration and general expenses were \$302 million. Technical services cost the industry subsector some \$78.1 million. Total expenses for private radio and television broadcasting stations were \$1,169 billion for the year, up from \$1,027 billion in 1983.

Net profits before income taxes, after adjustments for depreciation, interest expenses and other charges, were \$192 million, an increase of \$27 million over 1983. After provision of \$90.4 million for income taxes, net profits to the private stations were \$101.7 million, up by \$19.2 million over the previous year.*

Television broadcasting has high profitability which has helped it withstand the downturn in Canada's economy much better than radio broadcasting. Between the years 1972 and 1982, the pre-tax profit margin for the private television broadcasting industry fluctuated between a low of 17 percent in 1975 and a high of 21.5 percent in 1976. It started the decade at 20.5 percent and finished at 19.5 percent in 1982. During the same period, the pre-tax profit margin for private radio broadcasters

* The source of information for these three paragraphs and the one following is the Statistics Canada catalogue numbers 56-204 and 56-205.

showed a steady decline from 16.3 percent in 1972 to 6.5 percent in 1982. The decline was steepest over the last two years, dropping from roughly 11.5 percent in 1980 to 9 percent in 1981 and then to 6.5 percent in 1982.

The content portion of broadcasting can be crudely quantified in terms of the population average. According to the CBC, which maintains a running tab on this sort of information, with the exception of the Yukon and Northwest Territories, 99 percent of Canadian households have AM radios; 92 percent have FM radios, 98 percent of households have TV sets; 88% have colored television sets; and a further 43 percent of households have more than one television set.

The percentage distribution of viewing time by origin of program and station is skewed to American and English-language television. Of 70.3 percent viewing, Canadian Stations, 27.3 percent are viewing Canadian programs; of 29.7 percent viewing American stations, 72.7 percent are viewing non-Canadian programs of which 43 percent are distributed thru Canadian television stations and 29.7 percent are distributed thru American television stations.*

7.3.3 Emerging Environment

It has been acknowledge for many years that broadcasting has an unprecedented power in every country of the world. For Canada, with its two official languages, its vast size, its strong regional differences, its multicultural reality and its proximity to the United States, broadcasting is a vital means of maintaining a sense of national identity.² The evolution of the Canadian broadcasting system has been strongly influenced by the need to maintain our national identity while, at the same time, provide Canadians with entertainment and information.

New challenges and new technologies are being introduced in the broadcasting industry that will greatly increase the reach and number of broadcast signals transmitted within Canada as well as across our borders. There is however, a real possibility that these innovations could undermine the present Canadian broadcasting system and weaken our cultural integrity.³

To ensure that the Canadian broadcasting system can respond to the challenges and seize the opportunities presented by the new technologies, the Government developed a new Broadcasting Strategy for Canada in 1983.⁴ To implement the new Broadcasting Strategy for Canada the Government has taken the

* The above two paragraphs are drawn from the CRTC Facts Digest Publication of January 1984.

initiative to implement policies found imperative to the pursuit of its stated goals. For a complete description of these, see the government of Canada publication, "Towards a New National Broadcasting Policy." Further policies will be put in place once public input has been obtained (i.e., Broadcasting Task Force Report expected by mid-January 1986).

Generally, the Government proposes to encourage the private broadcasting sector to fulfill an expanded role in increasing both the quantity and quality of Canadian television and radio programming. A further proposal is to enhance and extend French-language broadcasting and programming services in Quebec and across Canada. At the same time, it intends to strengthen the French-language program production industry and, in particular, stimulate exports of programming produced by the French-language production industry in Canada. It also proposes to examine the establishment of a second private French-language television network in Quebec. Not to be remiss in its broad sweep, the new strategy also intends to respond to the needs of native people for broadcasting services reflecting both their language and culture.

7.3.4 International Environment

Success in foreign markets is crucial to recovering the investment needed to generate world-class programming. Measures are proposed to establish a framework for the international marketing of Canadian television programs in both official languages. These include the negotiation of co-production treaties with other countries, where desirable, and the extension of existing treaties to cover television programming.

Foreign competition to Canadian radio and television broadcasting is very real, especially competition from the U.S. On the other hand, the larger population and the vastly greater market in the U.S. gives producers in that country a far greater revenue base than in Canada. As a result, expensively-produced U.S. programs can be funded and amortized in the larger home markets. On the other hand, Canadian program producers have traditionally lacked the resources to compete against their counterparts in the U.S. Television advertising revenues on a per capita basis are only half those of the U.S. and the Canadian home market is too small for equivalent recovery of costs.⁵

These economies of program production are borne out in the viewing choices of Canadians. Foreign programs, predominantly from the U.S., account for 85 percent of viewing on English-language television during peak evening hours. They represent

77 percent of total viewing throughout the day. Only 5 percent of drama programming is Canadian and it represents only 2 percent of total viewing time. A similar situation exists for children's programming, with English Canadian children spending 83 percent of their viewing time on foreign programs. French-language television is in a healthier state. There is concern, however, that neither the language barrier nor the creativity and ingenuity of French-language broadcasters and program producers may be sufficient in themselves in the new broadcasting environment. Independent French-language producers have an even smaller domestic market than their English-language counterparts and, from a financial perspective, are in an even weaker position with respect to competition from foreign producers.⁶

The establishment of the Canadian Broadcast Program Development Fund is designed to overcome some of the weaknesses in Canadian programming and to stimulate the production of competitive Canadian television programs that will enable the country to exploit the dynamic and growing export market for quality programming. In pursuing its French-language broadcasting thrust, the federal government intends to place special emphasis on stimulating exports of domestically-produced French-language programming to other countries.⁷

As stated earlier, the international marketing of Canadian television programs in both official languages will be encouraged through negotiating treaties with other countries and the extension of existing treaties to cover television programming. Programming carried on Canadian, fixed satellites may be saleable in the U.S. In addition, Canada has feature film co-production treaties with France, the United Kingdom, Italy, Israel and West Germany. These treaties will be extended to cover television productions where possible, and Canada will negotiate similar treaties with other countries where desirable.⁸

CABLE TELEVISION SERVICE PROVIDERS

7.3.4 Structure

The Canadian cable television service provider industry, often referred to as CATV, is made up of 346 incorporated or individually-owned business organizations. The large majority of industry firms are small business. In 1983, 36 percent of the companies had less than 1,000 subscribers, while some 40 percent had between 1,000 and 6,000 subscribers.⁹ Less than 2 percent of the firms served 100,000 or more subscribers.¹⁰ Figure 8 shows a listing of the top 15 cable systems in Canada.

Figure 6
CANADA's TOP 15 CABLE SYSTEMS
August 1983

SYSTEM	SERVES	SUBSCRIBERS
1. Rogers Cable TV, Toronto, Ontario	Major Part of Toronto	353,969
2. Cablevision Nationale Ltée, Montréal, Québec	Montréal North/West and Suburbs	272,292
3. Rogers Cable TV, Vancouver, B.C.	Vancouver, Burnaby, Richmond	247,202
4. CF Cable TV Inc., Montréal, Québec	Montréal, Laval, Dorval and Area	140,977
5. Winnipeg Videon Inc., Winnipeg, Manitoba	Winnipeg (West of the Red River)	136,444
6. Scarboro Cable, Scarborough, Ontario	Scarborough	123,000
7. Maclean Hunter Cable TV, Rexdale, Ontario	Etobicoke, Part of Mississauga	112,267
8. Capital Cable TV Ltd., Edmonton, Alberta	East Part of Edmonton and Suburbs	107,600
9. Calgary Cable TV, Calgary, Alberta	North Part of Calgary and Area	104,864
10. Rogers Cable TV, Kitchener, Ontario	Kitchener, Waterloo, Cambridge, Stratford & Area	99,876
11. Télécablé Vidéotron Ltée, St-Hubert, Québec	Montréal South-shore Area	92,536
12. Cablevision Nationale Ltée, Québec City, Québec	Québec City, Ville Vanier and Area	92,000
13. Ottawa Cablevision Limited, Ottawa, Ontario	West Half of Ottawa and Suburbs	88,651
14. Skyline Cablevision Ltd., Ottawa, Ontario	East Part of Ottawa and Suburbs	87,000
15. QCTV Ltd, Edmonton, Alberta	West Half of Edmonton and Suburbs	80,961

Source: Compiled from Cable Communications, November 1983

These 15 systems have approximately 42 percent of the cable subscription market in the country.

In considering industry revenues, it is significant to note that approximately 55 percent of 1983 revenues were earned by the top 11 firms, comprising only 3 percent of the industry makeup. For the industry as a whole, the revenue curve is skewed dramatically to the larger companies.

Net profits for the CATV industry were \$34.2 million in 1983, up from \$18.2 million the previous year. Companies with more than 1,000 subscribers accounted for the lion's share of net profits (\$33.6 million), while only \$600 thousand was realized by the 36 percent of companies with less than 1,000 subscribers. As in the case of industry revenues, the profit curve is skewed very much in favor of the larger companies where economies of scale and density can be realized.

By far the largest share (88 percent) of industry revenues were generated through direct subscriptions for basic, discretionary and specialty services. Indirect (i.e., bulk) subscriptions generated a further 6.7 percent and installation services accounted for slightly more than 5 percent.¹¹

Figure 7

Cable television industry

Number of operating systems, subscribers, households, penetration levels, and number of employees, from 1979 to 1983, as of 31 August of each year.

	1979	1980	1981	1982	1983 ¹
Number of operating systems ²	423	424	439	450	493
Direct subscribers	3,382,476	3,644,181	3,990,214	4,196,790	4,440,760
Indirect subscribers ³	696,376	690,672	707,609	705,886	707,275
Total subscribers	4,078,852	4,334,853	4,697,823	4,902,676	5,148,035
Households:					
wired	5,929,669	6,059,492	6,327,243	6,560,890	6,811,678
in licensed area	6,195,070	6,381,879	6,656,560	6,850,864	7,063,603
Penetration:					
market	68.8%	71.5%	74.2%	74.7%	75.5%
franchise	95.7%	94.9%	95.1%	95.8%	96.4%
Employees	5,557	5,502	5,626	6,085	6,431

¹Preliminary figures

²Systems that submit an annual return

³Those provided with cable television service collectively through a third party, such as a landlord, hotel or motel operator or community association

Source: Broadcast Analysis Division, Broadcasting Directorate, CRTC

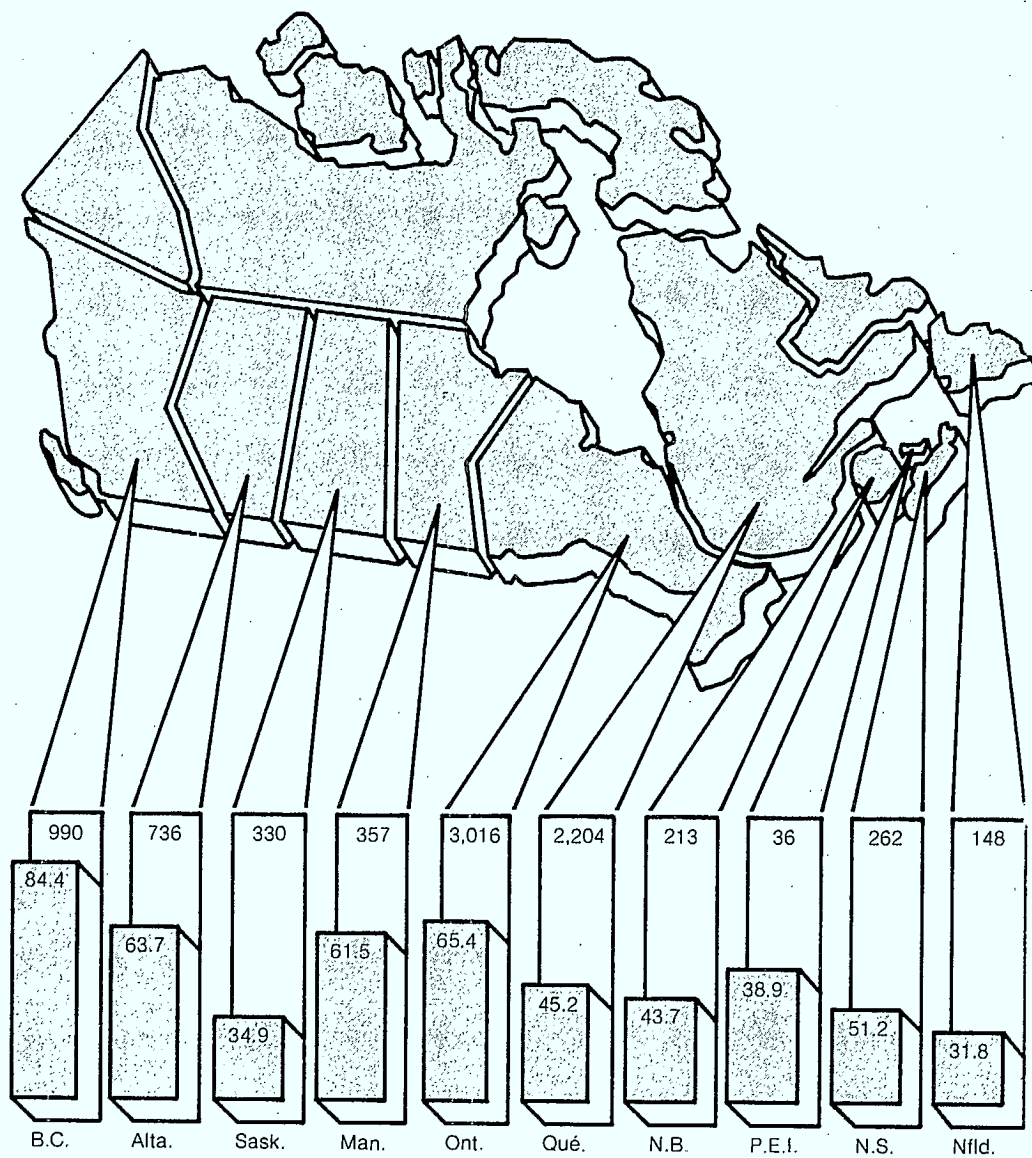
Basic cable service subscriptions, i.e., the service for which customers pay a flat monthly fee, reached a level of relative maturity in 1981 and the rate of growth has flattened out considerably since then. By 1983, the CATV industry was serving 4.38 million of 4.88 million individual households passed by cable. The picture is less clear for indirect subscriptions. However, industry statistics show that cable passed 1.89 million households in multiple dwellings and the industry served 699 thousand indirect subscribers. In total, 75 percent of the households passed by cable in 1983 were being served. Yearly subscriptions growth decreased from 361 thousand in 1981 to 231 thousand in 1982 and slipped further to 202 thousand in 1983.¹⁴ This indicates that new basic cable subscriptions have ceased to be the prime growth generator in the market.

The ratio of subscribers to employees declined from 1982. In that year, the ratio was 830 subscribers per industry employee. By 1983 the ratio had dropped to 797 to 1. The 1981 ratio was 813 to 1. The Canadian Cable Television Association's (CCTA) "Project 90" study sees this drop in subscribers per employee as symbolizing "a turning point for the industry--the launching of an era of multiple service and increasing business complexity."¹³

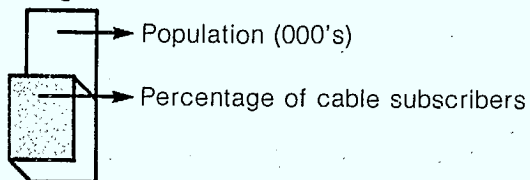
In examining the industry's performance on basic cable service, total expenses as a percentage of gross revenues remained constant at 61 percent from 1981 through 1983. In computing income before taxes, however, it is noted that the industry

Figure 8

Cable subscribers in Canada as a percentage of population by province as of March 1984



Legend



Source: Statistical Information Centre CRTC

showed a market sensitivity to interest rates. Again, as a percentage of revenues, income before taxes was 9 percent in 1981 when interest rates were 15 percent. It dropped to 8 percent in 1982 when interest rates climbed to 17 percent, but income before taxes has risen in 1983 to 12 percent when interest rates declined to 13 percent.¹⁴ Figures beyond 1983 are not available, but with interest rates continuing their decline, it can be assumed that the sensitive relationship between income and interest rates will also continue.

The CATV market is significantly affected by the number of subscribers per unit of cable, since this relates directly to average cost per subscriber. Therefore, economies of density influence the market structure. For example, it is more profitable to serve subscribers concentrated in urban areas than those dispersed in rural communities. It is even more profitable to serve several customers in a multiple dwelling unit than the same number of customers in single family dwellings. Primarily for these reasons, the largest firms in the industry are concentrated in Canada's major urban centres. Rogers Cable TV, the largest firm in the industry, had over 700 thousand subscribers in the Toronto, Kitchener-Waterloo and Vancouver areas in 1983. Cablevision Nationale Ltée in that year served 272, thousand plus subscribers in Montreal and a further 92 thousand in Quebec City for a total of 364 plus subscribers. None of the top 15 cable systems served subscribers in the Atlantic region (see Figure 8).

Figure 8 and 9 provides some industry statistics of CATV penetration by region. In comparing Figures 6 and 9, it is noted that the top 15 cable systems (represented by 12 companies) had 2.139 million subscribers in August, 1983. This represented approximately 43.5 percent of the total cable subscribers in the country.

Market penetration (the product obtained by dividing households wired into total subscribers) had reached 74.8 percent for Canada as a whole by August, 1982. Penetration was significantly higher in the Pacific region (90 percent) than in other regions of the country, leaving very little growth potential. Ontario, with 80 percent market penetration, had only moderate growth potential. In Quebec, however, only 59 percent of the market had been penetrated and that province had significant growth potential. Atlantic and prairie regions statistics indicate that those two areas have moderate potential for further market penetration. Franchise penetration (the number of households wired versus the number of households in the licensed area) was above 95 percent in all regions of the country except Quebec, where it was 91.4 percent.

The CRTC granted the first television discretionary service licenses in March, 1982. CATV commenced the service in February, 1983 with the distribution of the 24-hour movie channel

Figure 9
SELECTED ON CABLE TELEVISION PENETRATION BY REGION

	ATLANTIC REGION	QUEBEC REGION	ONTARIO REGION	PRAIRIES REGION	PACIFIC REGION	CANADA
SUBSCRIBERS HOUSEHOLDS (000)						
Direct Subscribers	266	961	1,629	703	658	4,216
Indirect Subscribers*	22	34	369	101	186	712
Total Subscribers(s)	288	995	1,999	804	844	4,928
HOUSEHOLDS (000)						
Households Wired(HW)**	367	1,696	2,497	1,104	938	6,592
Households in Licensed Area(HL)	385	1,844	2,570	1,120	962	6,882
Total Households(TH)	661	2,207	3,019	1,427	989	8,303
PENETRATION						
% Households Subscribing	43.6%	45.1%	66.2%	56.3%	85.3%	59.4%
% Households with Access(HW/TH)	55.5%	76.4%	82.7%	77.4%	94.8%	79.4%
Market Penetration(S/HW)	78.3%	59.0%	80.1%	72.8%	90.0%	74.8%
Franchise Penetration(HW/HL)	95.3%	91.4%	97.2%	98.5%	95.5%	95.8%
CABLE KILOMETERS	8,604	21,371	33,081	13,984	16,531	93,575

* Those provided with cable television serve collectively through a third party such as a landlord, hotel or motel operation or community association, etc.

** Households with access to cable which may or may not subscribe to the service.

NOTE: Totals may not add perfectly due to rounding.

"First Choice Superchannel" on cable systems across the country. By October 1983, approximately 500 thousand households had subscribed to one of the new premium entertainment services.¹⁵

In April, 1984, the CRTC licensed two Canadian specialty services, a 24-hour sports and a 24-hour music video network. This was followed a few weeks later by a license for an Italian/Spanish-language and a Chinese-language service. The sports network and the music network services will be delivered to cable television systems via the Anik D1 satellite.¹⁶ In the 1983-1984 time frame, the CATV industry invested several million dollars in marketing campaigns, scrambling equipment, retail outlets, additional personnel, and computerized billing systems necessary for the promotion and distribution of discretionary services.

Figure 10 gives statistics on discretionary cable services as of March 31, 1985.

Figure 10
DISCRETIONARY CABLE SERVICES - CANADA
Canadian discretionary service subscriptions - March 31, 1985

Province	First Choice Superchannel	Much Music	The Sports Network	Super Ecran	World View	China- vision	Tele Latino	Total
British Columbia	72,247	71,552	71,048		9,306			224,153
Alberta	57,160	56,290	56,605					170,055
Saskatchewan	14,905	6,238	6,981					28,124
Manitoba	4,966	1,179	1,207					7,352
Ontario	277,048	291,304	293,493	1,659		5,307	3,223	870,034
Quebec	25,386	99,027	99,671	84,989				309,163
New Brunswick	10,329	13,090	7,233	630				31,282
Nova Scotia	14,766	9,667	11,695					36,128
Prince Edward Island	1,463	1,105	1,281					3,849
Newfoundland	5,023	4,462	4,517					14,002
Total Canada	483,293	553,914	553,821	87,278	9,306	5,307	3,223	1,696,142

Source: Medlastats Inc.

Government regulation is a major determinant of the CATV industry structure. In licensing broadcasters, the CRTC has generally been protective of the licensee's position. This policy makes it easier to administer Canadian content rules but, other things being equal, reduces the profits of Canadian broadcasters. In the case of the CATV industry, regulation by the CRTC has been influenced by the threat that U.S. programming can be relayed by cable direct to the consumer without any role played by the local broadcast stations.¹⁷ The CRTC has exercised its power to protect the profitability of local broadcasters. The CCTA's Project 90 study maintains that current regulations are hurting the CATV industry, particularly the 6, 5 and 4 percent rate ceiling increases imposed for 1983-1985. The report says that rules forbidding the sale of advertising by cable operators that limit the number of U.S. services offered or that set certain levels of Canadian programming content have restricted the flow of revenue needed for new investment and hampered the ability of the CATV industry to compete in the marketplace.

7.3.6 Conduct

Government regulation not only influences the structure of the cable television industry, but plays a prominent role in the industry's conduct in the marketplace. Each cable television company is licensed by the CRTC to serve a specific territory; in effect, giving the licensed firm a monopoly in a particular area. As a result, the firm is able to earn profits in a market which

has an entry barrier to any other cable offering a similar product. Competition comes only from other types of family entertainment or from television programming distributed by means other than cable. Thus, government regulation allows the cable television companies to operate in a protected environment.

In granting a cable television license, the CRTC imposes certain restrictions on the services to be provided and on the protection of the financial position of private broadcasters. The CRTC, through conditions to the license, general regulations and policies, regulates operating practices, basic subscription rates and cable services. These restrictions are aimed primarily at ensuring Canadian ownership and control of the industry, providing for a certain level of Canadian content in the programs distributed via cable, and protecting the interests of Canadian television stations. For example, all Canadian television stations within range of the cable company must be given access to the basic cable service before any U.S. stations are added.¹⁸ Another CRTC regulation to protect Canadian broadcasters within a cable franchise area is the simultaneous substitution of programs. This is designed to ensure that local Canadian broadcasters have access to the widest possible audience for their programming and advertising. In addition to the regulations imposed upon the cable television industry by the CRTC, DOC has established specific technical standards for the quality of the signals delivered into the subscriber's home via cable. Cable television operators must obtain a technical operating certificate from DOC for the construction and operation of the antenna structures and electronic equipment used in processing the signals distributed to subscribers. Each company's system is tested regularly.¹⁹

The cable television industry, like most industries, has its ups and downs. The fact is, however, that cable television firms are generally quite profitable. The size of the market and the size of the firm affects the rate of profits with larger firms in larger markets being more profitable. This points to economies of density. However, one of the major factors in increasing profits is the penetration rate. Costs per subscriber decrease in relation to increases in market penetration. There is, however, a maximum number of cable subscribers in Canada and, as was pointed out earlier, the penetration rate reached 74.8 percent for Canada as a whole in 1982. By 1984 it is estimated that the rate had increased to approximately 80 percent.²⁰ In other words, the number of untapped or partly tapped markets has shrunk to the point where penetration growth is close to the maximum. Cable television firms are now faced with concentrating on cultivating present subscribers by providing enhanced services. This will no doubt lead to some rationalization within the industry with a possibility that a certain amount of consolidation will occur. Smaller firms with a small share of the market and limited resources will find it difficult, if not impossible, to raise the funds necessary to invest in new

technology and equipment. At the same time, new and increased engineering and marketing skills will be required and management will become more complex and sophisticated. In general terms, it will require the industry to be innovative, take risks, and become more market oriented.²¹ In the face of this challenge, some firms will find it very difficult to survive.

7.3.7 Emerging Environment

The Canadian cable television industry reached a state of relative maturity in the provision of basic cable services in the first half of the 1980's. As well, discretionary cable services have been introduced at considerable cost in new technology and capital investment. Challenges to the industry arose in the areas of marketing and operating strategies. External challenges appeared by way of video cassette recorders (VCR's), satellite master antennae (SMATV) systems, home earth stations, and other entertainment choices.

Project 90, a study conducted on behalf of the CCTA, looks at the CATV industry over the next 5-year period. The objective of the study "is to provide an indication of the service demands, operational obstacles, financial and economical (sic) constraints, and the regulatory environment facing the industry" between 1985 and 1990. Project 90 sees the main factors impacting upon the industry between now and 1990 to be: increased competition and service demands, new technology and a new approach to regulation.

The video retail market servicing the fast-growing number of VCR's in Canadian homes is providing a direct challenge to the CATV industry. At the same time, serious competition exists through new alternative television distribution systems such as SMATV and direct-broadcast-satellite (DBS) systems.

Project 90 anticipates that new technologies such as digital television, high definition television and stereo audio will compel the industry to deliver higher quality signals and to make major investments of capital.

The industry plans on expanding capacity by some 50 percent over the next five years according to a CATV industry survey conducted by Project 90. This will increase the average number of channels per system from the current average of 27 to 41. Premium service is expected to be significant, but not dominant by 1990. Using optimistic assumptions, Project 90 estimates that premium service may only account for 20 percent of return on investment by 1990. Basic cable service is expected to be the backbone of the industry into the next century. Project 90 also anticipates that the 1990 regulatory environment is "unlikely to offer the historic degree of protection given to traditional broadcasters nor to the cable industry." Growth and

development will be dependent upon initiative and entrepreneurship within the CATV industry.

Canada's place in the international cable television market is small. Some firms have, however, penetrated the U.S. market. Rogers Cablesystems and Standard Broadcasting have both invested heavily in the U.S: Roger Cablesystems, although incurring a debt of \$700 million, picked up 500,000 subscribers in 15 cable systems in 1984. Standard Broadcasting bought Valley Cable TV of California, which operates a cable system in West San Fernando Valley near Los Angeles. Maclean-Hunter owns cable systems in Michigan and New Jersey.

The relative maturity in cable penetration in the U.S. is somewhat less than in Canada, leaving some real potential for growth. The costs for entry into the U.S. market are such, however, that only the largest and most profitable cable firms can contemplate the move. This is especially true in light of the major capital outlays required over the coming years to sustain or enhance the industry's competitive position within the Canadian market.

7.3.8 Cable Demand Projections

In a recent study commissioned by the Department of Communications Nordicity gave the following projections of demand for cable service in Canada.

- i. Basic Cable Subscribers: Projected to increase by about 225,000 subscribers per year to 1985 with slightly over 200,000 a year to 1990. This is based on an analysis of (i) growth in number of households, (ii) extension of cable services to previously marginal areas, and (iii) an increase in the penetration rate of basic cable to homes passed that bring lower penetration systems closer to the national average.
- ii. Convertor Subscribers: The number of subscribers availing themselves of new services on the mid-band available through a set top or integrated convertor will increase comparatively rapidly (at 400,000 subs/year) over the next 2 years, with a somewhat slower growth rate in the last half of the decade (at 300,000 subs/yr). The faster earlier rate is based on the "lift" of pay-TV and new specialized services.
- iii. Pay-TV Households: Projected to grow from a current 8.5% to about 40% of basic subscribers by 1990. This is far lower penetration than for pay-cable units in the U.S. but is based on the substantially higher-priced pay-TV services in Canada. The projections are based on industry estimates

assuming that pay-TV services are marketed as stand-alone services at the rates they are now commanding.

- iv. Addressability: Based on CRTI's 1983 survey of cable operator scrambling system selections at the launch of pay-TV, 44% of decoder are addressable. It is estimated that addressables will rise to 50% in 1985 and 65% in 1990.
- v. U.S. Tier and Pay-per-View Households: This is projected to be tied to the growth of addressable households, since the introduction of discretionary tiers of U.S. services and pay-per-view would depend on addressability. It is assumed that 75% of addressable subscribers would be tiered and pay-per-view customers by 1985 and 90% by 1990.
- vi. Home Computer/Games Software (one-way): This is essentially the "downloading" of software for home computers and home video games, whether the terminal was acquired as a stand-alone item by the household, or sold or leased by the cable operator. This means that cable micros like Nabu will have made significant market progress within the next 2 year timeframe or that home computers of the popular makes (e.g., Atari, Commodore) will be plugged into cable downloading services via adapter. In the latter part of the decade, home computer is projected to become available to 2.4 million households. It is assumed that approximately one third of them would be subscribers to the software service providers via cable.
- vii. Teletext (one-way): A low terminal cost teletext system is assumed to be developed as a marketable service, particularly in the latter part of the decade. It would be in operation by 1985 and would find a niche because the lower price of its terminal compared to a home computer would lead to higher penetration.
- viii. Security/Transactional (two-way): It is projected that 15% of homes would be equipped for two-way services in 1985. Canadian demand should be less than that of the U.S. because many new U.S. cable franchise winners are under obligation to introduce two-way cable at the outset.
- ix. Interactive/Transactional (two-way): Projections are for 15% of addressable subscribers, allowing for both cable operators with two-way cable capacity and potential hybrid systems with telephone line return feed as a way of providing interactive services. About 7.5% of addressables could be linked to some form of this service by 1985 and 15% of addressables reached in 1990.
- x. Institutional Services: Although experimentation and some applications may be developed over the short term, the role

of cable will not be properly exploited until the end of the decade. At that point in time it is anticipated that there will be major institutional uses of cable providing coaxial (or even fibre optic) linkages within major urban centres.

The above projections can be summarized as follows:

<u>Subscriber Projections</u> (000)			
<u>Basic Services</u>	<u>Current</u> <u>(Mid 1983)</u>	<u>1985</u>	<u>1990</u>
Basic cable subs	5,345	5,800	6,900
20 plus channel subs	3,200	3,900	5,200
Subs with convertors	2,100	2,400	4,400
<hr/>			
<u>New Television Services</u>			
Pay-TV	400	1,800	2,760
Addressable scrambling systems	124 (41%)	900 (50%)	1,820 (65%)
Non-addressable systems	266 (59%)	900 (50%)	980 (35%)
Tiered service and PPV households	-	675 (75% of addressable)	1,639 (90% of addressable)
<hr/>			
<u>Non-programming services</u>			
Home computer/game software (one-way)	-	75	750
Teletext (one-way)	-	25	1,000
Security/telemetry (two-way)	5	19 (15% two-way)	75 (7.5% of two-way)
Interactive/transactional	-	67 (7.5% of addressable)	273 (15% of addressable)
<hr/>			
<u>Institutional services</u>	minimal	some applications	some market penetration of data/video networks in major urban areas

Source: Estimates prepared by Nordicity.

CANADIAN BROADCASTING CORPORATION

7.3.9 Structure

The Canadian Broadcasting Corporation (CBC) is a publicly-owned corporation encompassing national radio and television networks. During this 1983-1984 period, the CBC has 89 originating stations, 70 private affiliates and 1,421 rebroadcasting stations. The corporation delivers its broadcasting service to Canadians through six national networks: an English and a French-language television network, an English and a French-language AM radio network, and an English and French-language FM radio network.

In addition to the six national networks, the CBC provides:

- a Northern radio and television programming service, including native-language programming;
- two national satellite-to-cable House of Commons networks, one English, the other French;
- a television captioning service for the hearing-disabled;
- an international short-wave radio programming service in eleven languages to countries around the world; and
- host broadcasting services for foreign broadcasters when international events occur in Canada.

In 1983, 99 percent of English-speaking Canadians could receive the CBC's English language radio and television services. As well, the corporation's French-language radio and television services were available to 99 percent of Canadian francophones.²²

7.3.10 Conduct

In 1984, the CBC had air time sales (advertising) revenue of \$154 million, approximately 16 percent of air time sales for the Canadian radio and television broadcasting industry as a whole. Television advertising sales accounted for the bulk of this revenue (\$153.7 million), while radio air time sales generated \$410 thousand.²³ The net cost of CBC operations increased by 10.1 percent to \$809.7 million in 1984, up from \$735.2 million the previous year.

In November, 1983 the federal government announced that a CBC broadcast centre will be constructed in downtown Toronto.

The centre will be part of a mixed-use development project on a 9.3 acre site owned since 1978 by the CBC. The development will

be a privately-financed project with the CBC leasing back that part of the development to be used as the broadcast centre. It is expected to be operating by 1988 or 1989. The new centre will achieve a consolidation of all CBC radio and television facilities now dispersed throughout the Toronto area. Annual leasing costs to the CBC are expected to be less for the new facility than the projected costs to own, lease and operate the facilities now occupied. The CBC predicts that the new centre will be of significant benefit in achieving two important goals: the Canadianization of its prime time television schedule and an increase in the number of co-productions with independent producers, using CBC facilities.

7.3.11 Emerging Environment

One of the policy initiatives proposed by the federal government in the Broadcasting Strategy for Canada called for measures to assure the strengthened performance of the national broadcasting service as a crucial component of an identifiably Canadian broadcasting system. It also stated the intention of the government to conduct a fundamental review of the role of the CBC to ensure that it provides programming appropriate to the new broadcasting environment. The review was carried out and in 1983 the federal government later endorsed the policies flowing from the review.

For a complete description of these, refer to the Government of Canada publication, "Building for the future: towards a distinctive CBC." The CBC is to become aggressively involved in the sale for profit of its programming, related cultural products and technical consulting services, in both domestic and world markets.

BROADCASTING EQUIPMENT MANUFACTURERS AND SUPPLIERS

7.3.12 Structure

Broadcasting equipment consists of the equipment required by radio and television broadcasters and cable system operators to construct and operate their systems, as well as certain devices used by consumers to receive radio and television programming.

The radio and television broadcasting industry requires towers and antennas, transmitting and studio equipment in their day-to-day operations. The cable television industry uses five main types of communications equipment: headends and related components, distribution networks, customer devices and drop lines, tools and test equipment, and program production equipment. Individual consumers need products such as TV

converters and signal unscrambling devices. Consumers are also purchasing an increasing number of video cassette recorders (VCR's) and television receiver-only antennas (dish antennas).

Many of the products in the broad categories above overlap between the cable television and broadcast subsectors as well as overlapping into the telecommunications and electronics industries. Since there is a dearth of statistical data related specifically to the radio and television broadcasting equipment market, the picture is better defined in the cable television equipment market, and will be used, therefore for this analysis.

Canadian CATV equipment manufacturers market their products domestically and internationally, with the United States providing the major export market. The domestic market is distributed geographically in rough proportion to cable penetration. Figure 13 shows the total domestic market for 1983 as estimated by the Department of Communications from confidential data (which can be published in an aggregate form) obtained from suppliers.

The companies manufacturing and/or assembling equipment are concentrated in Ontario. Those outside Ontario are located in Quebec, British Columbia and Saskatchewan.

Figure 11
TOTAL DOMESTIC MARKET 1983

	Sales (\$'000,000)	% Distribution
<u>Suppliers</u>		
Canadian-owned producers	40-50	36
Foreign-owned producers	25-35	23
Imports	45-55	41
Total	110-140	100
<u>Product Line</u>		
Headend	5-10	5
Distribution plant	50-60	45
Drops and customer devices	30-35	27
Devices	20-25	18
Other	5-10	5
	110-140	100

Source: DOC, Suppliers of Equipment and Services to the Cable Television Industry in Canada.

The key market segments are significant determinants of the structure of the CATV market, and this can probably be assumed to hold true for radio and television broadcasting suppliers as well. The key market segments for CATV suppliers are:²⁶

- procurements by major multi-system operators, who can provide a sufficient market for the supplier to undertake development of a new product or service;
- small multi-system operators and medium-sized single systems operators, who generally follow the leading equipment purchasers and order off-the-shelf equipment services;
- smaller cable operators whose requirements may differ in some cases so that products or production has to be down-scaled to meet the customer's modest demand;
- direct sales to subscribers for such products as unscramblers and converters and, in the future, for other types of terminal devices.

Domestic and foreign equipment manufacturers are usually linked to the medium and small-sized broadcasters and cable service providers through distributors. The distributors generally handle a range of broadcasting and/or cable products.

7.3.13 Conduct

The major product areas of Canadian manufacturers and distributors are detailed and a profile of the cable industry in a DOC publication entitled "Suppliers of Equipment and Services to the Cable Television Industry in Canada." A few of the companies have integrated product lines, e.g., Jerrold Lindsay Specialty Products, Delta-Benco-Cascade and Triple Crown Electronics, while the others specialize in one or two product areas. A fully integrated product line is important in maintaining a healthy position in the export market.

There is a very little vertical integration between equipment manufacturers and operators, although there are a few exceptions in the CATV industry (e.g., Lindsay Specialty products and Lindsay Cable). There is, however, a great deal of ongoing contact between the manufacturers and the engineering departments of the large cable and broadcasting firms. In many cases, successful manufacturing companies have ex-operator engineers and technicians on staff. One of the determinants to manufacturing company success is a sound background to cable and broadcast operations.

In the field of research and development, particularly in the CATV industry, several subsectors of the industry engage in

developing new or improved products and techniques. Figure 14 shows the R & D effort of companies in Canada engaged in the manufacture of cable television products.

The Cable Telecommunications Research Institute (CRTI), established in Ottawa in 1979, serves as a focal point for R & D for the industry as a whole. The CRTI's primary objectives are to plan and evaluate new opportunities for the Canadian CATV industry and to ensure that products are available to support new services. CRTI carries out some R & D in-house mainly in the areas of conceptual and feasibility engineering for prototype development. The institute also instigates R & D projects within the industry and serves as a forum for technical exchanges for new technology.²⁵

Some universities, notably in the provinces of Saskatchewan and Quebec, have made significant contributions to R & D for the CATV industry. Also, in areas where telecommunications and cable television overlap, Bell Northern Research has engaged in R & D technology such fibre optics and local area networks.

Figure 12

R&D EFFORT SELECTED CATV SUPPLIERS

Company	Number of Employees in R&D	Total company Staff	R&D Employees as a Percentage of Total Staff
General Instrument	25	350	6
Lindsay Speciality	30	500	6
Triple Crown Electronics	12	120	10
Delta Benco	15	145	10
Microcom	10	80	13
Andrew Antenna	25	200	13

Source: DOC, Suppliers of Equipment and Services to the Cable Television Industry in Canada, p. 32.

7.3.14 Emerging Environment

The broadcasting and cable manufacturing industry within Canada is tied to events in the service provider subsector. The demand for new equipment is dependent upon the general economic climate and upon growth in the provision of broadcasting and cable services. This growth is, in turn, largely determined by the regulatory environment and the policies of the federal government.

One that is expected to stimulate manufacturing growth is the growth of the licensing of tiered satellite-delivered video services. This new television service received encouragement in the broadcasting strategy outlined by the federal government in 1983 (see point 7.3.3 above).

In the U.S., deregulation and other factors are leading to the installation of two-way cable systems. Investment in this new technology will force cable operators to establish new services. These developments are expected to reflect favorably upon manufacturers. Regulation of new services in Canada will motivate cable operators to upgrade their distribution network. Taken together, the projected growth in new television services and the extension

of services to remote areas should lead to a growing demand by broadcasters and cable operators for new equipment. Canadian suppliers should, therefore, have a potentially strong domestic market for the remainder of the decade.

7.3.15 International Environment

The Canadian market for basic cable and broadcasting services is relatively mature, offering only modest potential for growth in that area. There is, however, significant potential for growth in basic cable services in the U.S. and some European countries. The U.S. market has no major trade barriers to Canadian manufacturers and, because of its proximity, this market is more accessible to Canadian manufacturers than to their Japanese and European counterparts.

The European market for CATV equipment is expected to grow significantly between 1982 and 1987. The United Kingdom market is expected to be particularly attractive to Canadian suppliers. Intergovernmental arrangements will be a key in penetrating some European markets. The recent Quebec-France agreement on Quebec firms participating in French cable systems development is an example.

Some Canadian firms have attempted to compete in the domestic and international market by selling a total system or service package, including the headend/subscriber hardware and software. This is a high risk strategy, however, as was

demonstrated by the difficulties experienced by NABU in marketing their integrated cable/home computer system. One of the strategies employed by some small Canadian manufacturers is to identify and concentrate on a particular speciality product. Solutec's tele-management system and Teledac's character generators are examples of this strategy. A strategy for Canadian firms with expertise in product design is to license their technology to major foreign firms with marketing and volume production capacity. A licensing agreement between SED System of Saskatoon and General Instruments is an example of this strategy being used. "World product mandate" status has been granted to some Canadian subsidiary firms by their foreign-based parent company. For example, the Jerrold Division and the Satellite Systems Division of General Instruments have world product mandates for their operations.

Competition in the international marketplace is increasing and becoming more complex. Canadian manufacturers will have to put forth sustained and dynamic efforts to maintain and increase their current international market share.

FOOTNOTES

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7.4 Cultural Industries

Canada's Cultural Industries are defined for the purpose of this analysis in terms of five-submarkets: performing arts; sound recording; visual arts; film and video; book, periodicals and newspaper publishing.

PERFORMING ARTS

7.4.1 Introduction

The performing arts (P.A.) industry is comprised of companies and individuals, involved in the production of "live" performances of drama, dance, music and opera.

The "live" component of P.A. means that the product is completely perishable, thus production and consumption take place simultaneously. The work of writers, composers, and other creative artists which are interpreted by directors, conductors, and choreographers are then produced and presented as "finished products" by actors, musicians, singers, and dancers. Technical staff and other backstage personnel utilize a given performance space to create the necessary carriage system for the product. The live production and consumption of P.A. also requires varying degrees of pre-production activity such as rehearsals, costume/set manufacture and lighting design.

7.4.2 Structure

In 1982* there were a total of 253 firms recorded in the performing arts of which 164 were theatre companies; 58 were music companies (orchestras and associated groups); 24 were dance companies and 7 were opera companies. Of all P.A. companies, 35% were located in Ontario and 30% in Quebec. This is most likely explained by the population distribution, particularly with regard to the "pull" of metro Toronto as a cultural centre and French language culture with regard to Quebec.

The supply of P.A. has grown at a remarkable rate in recent years. Between 1971 and 1981, the total number of P.A. companies in Canada grew by 525% from 40 to 210. Output as measured by the total number of performances increased by 453% over the period from 5,975 in 1971 to 27,040 in 1981.

The growth of the supply of performing arts has been paralleled by a similar growth in the P.A. labor force. This,

* Latest available Statistics Canada data.

despite the fact that monetary incomes of performing artists are on average significantly below that of the general labor force. Over the period between 1971 and 1981, the number of producers and directors in Canada grew 211%; the number of musicians grew 116%; dancers and choreographers grew 271% and the number of actors/actresses grew 261%. By comparison over the same period, the general labor force grew 39%. This massive growth in the supply of the P.A. is only explained in part by a corresponding increase in demand. Over the period 1971-1981, total attendances grew by 247%.

Ticket sales constitute only one source of revenue for performing arts firms. In 1982, ticket sales accounted for approximately 33% of total revenues. Figure 15 below gives a complete breakdown of all P.A. revenues by source. From the figure it can be seen that half of total revenues were "unearned". The largest source in this category was government grants which accounted for 74% of unearned revenues and 37% of total revenues. In this respect, government funding is the most important source of revenue.

Figure 13

Total P.A. Revenues By Source 1982

Source	\$(M)	\$(M)
<u>Earned Revenue:</u>		
Ticket Sales	50.2 (33%)	
Media Income, Guarantees, and other	25.8 (17%)	
Total Earned Revenue		<u>76 (50%)</u>
<u>Unearned Revenue</u>		
Federal Government	31 (20%)	
Provincial Government	19 (12%)	
Municipal Government	7 (5%)	
Total Government Subsidies		<u>57 (37%)</u>
Total Private Sector Grants (Corporations, foundations and individuals)	<u>20 (13%)</u>	<u>20 (13%)</u>
Total Revenue	<u>153 (100%)</u>	<u>153 (100%)</u>

Source: Statistics Canada, Catalogue 87-001, 1982.

The growth of government subsidies to the P.A. from the mid-sixties to the mid-seventies has been substantial. Figure 16 presents the real growth in Canada Council grants to the arts for the period 1971-1983. The figure shows that real growth increased by 33% between 1972 and 1987. Thereafter, there was a decrease in real grants but by 1982/83 a positive growth was recorded.

Figure 14

Canada Council Grants to the P.A.: selected years
(Constant 1971 dollars)

YEAR	Total Grants (\$000's)
1972/73	9,106
1977/78	12,088
1980/81	10,587
1982/83	11,094

Source: Canada Council: Trend in Support to the Arts, 1984, p. 14.

Since the creation of Federal and Provincial funding agencies, the proportion of unearned revenue by the P.A. from each level of government has changed.

From figure 15, it can be seen that the emphasis has shifted away from municipal funding to Federal and Provincial funding between 1961 and 1971 with provincial support continuing to gain in relative importance against federal support in the subsequent period.

Figure 15

% of total Government Grants to the P.A.
by level of Government

	1961/62	1971/72	1981/82
Federal	51%	58%	54%
Provincial	25%	32%	35%
Municipal	24%	10%	11%

Source: E. G. West, 1985, p. 9.

Given the fixed costs associated with artistic productions are high and given that the P.A. audience is a small percentage of the population, the production of works where quality or "excellence" is a major concern requires considerable and continued financial investment. To the extent that a large company can achieve national/international recognition, attract world class performers and provide a high quality product on an ongoing basis, the government has provided the substantial resources which are necessary. However, given that the government has a fixed budget, such large scale investments must be limited to a few "national" companies. Statistics for 1982 (see figure 18) show that out of 141 P.A. firms operating in Canada, 4 had total revenues equal to or greater than \$10M. The combined total revenues of these firms represent approximately 24% of total revenues for all firms. Therefore, there are "barriers to scale" resulting from a "first in" advantage. Having chosen certain companies to achieve large scale operation, government funding agencies face increasingly high costs of switching the allocation from one year to the next. In other words, the benefits from large scale are seen to accrue from continuous investment over time.

Figure 16
 Performing Arts
 Total Revenues (by source) and Expenditure per
 Spectator 1982

	T. Revenue/T. Attendance
Box Office (and other earned revenue)	\$ 7.53
Government Funding	\$ 5.66
Private Sector Funding	\$ 1.97
Total	\$15.16
T. Expenses/T. Attendance	\$15.60
Net Deficit per spect.	-\$ 0.44

Source: Statistics Canada, 1985, Catalogue 87-527, p. 10.

In the above figure, the private sector accounts for 63% of total revenue per spectator while the government accounts for the remaining 37%. The government to some extent can be viewed as subsidizing deficits, which in the private market would lead

firms to either alter their behavior or go out of business. While many economic justifications can be made for this action, it spawns a potential problem in that companies who have been selected for financial subsidy by arts councils may incur deficits which they have no incentive to reduce. Thus, the practice of funding the deficits of long-standing clients will create "barriers to exit".

Despite the massive growth in the P.A., on average, firms still operate at deficit. Figure 19 shows that in 1982 total revenue per spectator was \$15.60. In particular, dance companies had the greatest average deficit and opera companies the smallest average deficit.

Figure 17
Expenditures on Personnel by Discipline - 1982

<u>Personnel</u>	Drama \$000's (%ATE)	Dance \$000's (%ATE)	Music \$000's (%ATE)	Opera \$000's (%ATE)
Artistic	117.8 (24.5)	470.0 (58.4)	311.9 (35.4)	614.0 (38.2)
Technical	74.4 (15.5)	20.2 (2.5)	122.7 (13.9)	181.3 (11.3)
Administrative	55.0 (11.4)	91.5 (11.4)	68.6 (7.8)	130.2 (8.1)
Other	20.3 (4.2)	4.9 (0.6)	1.5 (0.2)	11 (0.7)
Total Personnel Exp.	<u>267.5 (55.6)</u>	<u>586.6 (72.9)</u>	<u>504.7 (57.3)</u>	<u>936.5 (58.3)</u>

ATE - Average Total Expenditures

Source: Statistics Canada, 1982, Catalogue 87-001, p. 9.

New firms face implicit barriers to entry, since funding agencies such as the Canadian Council requires most new companies to operate for a probationary period before they are eligible for subsidy.

The fact that the P.A. are highly labor intensive can be seen by examining the costs of production. In 1982, salaries (artistic, technical and other personnel) accounted for 60% of a company's total expenditures, on average. However, types of expenditures on personnel vary across disciplines.

As illustrated in Figure 19, artistic expenditures account for 60% of A.T.E. for music organizations, while they were much lower for Drama, Dance and Opera. However, these organizations had much higher technical expenditures relative to opera.

Physical productivity in the P.A. cannot be increased by say, removing a brass section in an orchestra or by performing a dance routine at twice the speed intended by the choreographer. Such attempts merely change the nature of the product. Constant productivity suggests that the P.A. will be subject to the problem of costs which are continually rising relative to output, as wages and productivity rise in other sectors. Surprisingly, recent evidence shows that in fact over the period of 1971-1980 average total costs per spectator fell by 64%. This substantial decrease in artistic costs can be attributed, in part, to the effect of inflation of artist's salaries. While such an effect might be considered inequitable, one should be reminded of the huge increase in the P.A. labor force over the same period. Such apparent voluntary acceptance of lower real earnings can be explained in terms of the "psychic income" or job satisfaction which artists receive, particularly if wages are viewed as the compensation for the unsatisfying component of an individual's labor.

Technical progress in the P.A. has not remained entirely static. The advent of computerized lighting is one example of a small number of technical improvements which have directly affected the P.A. in recent years. Productivity gains are also desirable in the tendency for many contemporary works to involve smaller numbers of live performances. However, the problem of audience acceptance of contemporary performances suggests there will be a lag of several years before such works become generally accepted.

7.4.3 Conduct

In general, the P.A. arts must compete with an expanding leisure industry, where technical progress and development have adapted more easily to changing market conditions. Firms in the P.A. arts can be viewed as operating in three separate markets, as defined by their source of revenue. First, P.A. companies compete with each other and alternative charities for private donations.² The P.A. market also involves artistic collusion between organizations with the overriding consideration being the general health of the industry. This tends to reduce overt competition.

Given the structural importance of product differentiation, (technically, every performance is a different product), there is considerable diversity in prices but limited competition. Prices are almost universally subsidized as a result of unearned revenue, however, there is, it seems, little evidence to suggest that P.A. firms consciously engage in price competition.

The demand for the P.A. is generally accepted to be largely insensitive to ticket prices, and the majority of the

audiences who attend the P.A. have been shown to be relatively wealthy and well educated.³ Indeed, the "demand side" evidence suggests that across the board price subsidies are inefficient since the majority who benefit from a lower ticket price could afford and would willingly pay for an unsubsidized ticket. To the extent that marginal attenders can be attracted by lower prices, "voucher" schemes have been proposed as an alternative to across the board subsidies.² Such schemes have the advantage of targeting those most likely to respond to lower prices.

Price discrimination is practised successfully by most P.A. firms in the form of market segmentation by demographics and by time. For example, student discounts and matinee discounts are common forms of price discrimination. Another price strategy in the P.A. which grew in popularity during the 1970's and is now common practice is that of subscription selling. The advantages of subscription selling are twofold: firstly, buyers are committed to attend several performances, thereby encouraging increased attendance. Secondly, buyer must accept a "package" of performances that are likely to contain both known popular works (classics) and relatively unknown contemporary works. In this way P.A. firms can further their artistic objectives. However, it should be made clear that subscriptions encourage increased frequency of attendance by current demanders rather than encouraging new demand.

Artistic quality objectives relate the present performance of firms to future attendances through their reputation. Those firms who successfully develop good reputations can expect a loyal and increasing number of audience members. However, more often than not, P.A. companies form collusive groups to collectively further the achievement of excellence and other artistic goals. The mobility of artists between companies serves to reduce the potential for competitive advantage which might otherwise arise under exclusive contracts.

In the market for private grants, P.A. companies essentially produce a "joint product" that is the creation of a performance is also a vehicle for advertizing. In particular, corporations can receive real marketing benefits from sponsoring P.A. events, however, large successful P.A. companies tend to be favored by corporations who, not surprisingly, wish to associate their name with popular works which are known to be of high quality both in content and in performance. For this reason small, new, contemporary or experimental P.A. companies tend not to receive corporate support.

7.4.4 Emerging Environment

One issue which has received an increasing amount of attention is the ability of P.A. firms to rely more heavily on

the private sector as a source of unearned revenue. There is also a growing tendency for P.A. firms to behave more like the profit seeking firms of the private sector, that is, the development of financial efficiency and advanced marketing skills are becoming more prominent in the internal structure of P.A. firms. Selling the arts as a carefully-packaged product would appear to be replacing "art for arts sake".

Figure 18 shows the trend in private subsidies to the P.A. for the period 1975-1981.

Figure 18
Private Subsidies to the P.A. by Source
Canada 1975-1981
(constant 1971 dollars)

	1975	1977	1979	1981
TOTAL PRIVATE.....	3582782	4999718	5404618	7187838
Individual.....	962614	1283378	1719968	3197926
Corporate.....	1342758	1931000	1567339	2515743
Foundation.....	598117	600199	977480	101218
Not Specified.....	679293	70415	277288	122823
Other Grants.....	--	1114726	866606	329318

Source: Statistics Canada, Catalogue 11-206, 13-201.

The figure shows that in real terms total private subsidies have more than doubled over the period. In particular individual donations grew 186% between 1979 and 1981, while corporate donations grew 160% in the same period. It is true that private subsidies remain a small proportion of total revenues (13% in 1982) but recent initiatives proposed by The Special Committee for the Arts in Ontario (1984) and the recent federal interest which has resulted in a task force on private support for the arts (presently conducting its inquiries at the time of writing) indicates that private subsidies as a source of revenue are likely to assume increasing importance to P.A. companies.

Another trend which gained prominence around the mid-seventies is an increased government interest in encouraging Canadian Content in the P.A. This view was reinforced in the Applebaum Report (1984)⁴. In a way Canadian Content in the P.A. has been viewed as an infant industry which must be nurtured and protected against outside influence particularly from the U.S.A. Yet, since Canadian Content in the P.A. is invariably represented

by contemporary works relative to known classics predicts that the "infant" may remain funded by the government for some time to come.

7.4.5 International Environment

In the world market, Canada's P.A. firms compete with other countries, not for profits or even for audiences directly, but for national prestige and international acclaim or recognition. In this market, government funding is made available to national companies or companies with reputations for excellence to tour or attend festivals. To the extent that these companies are "goodwill Ambassadors" for Canada some funding is undertaken by the Department of External Affairs.

VISUAL ARTS

7.4.6 Introduction

The Visual Arts (V.A.) can be defined as works which are appreciated primarily through the visual senses and which possess some combination of aesthetic and educational qualities. Works such as paintings; sculptures; photographs, artifacts of historical or scientific importance fall under this definition. In general the market has three subsectors: The non-profit public sector, the non-profit private sector and the for-profit private sector.

Non-Profit Public Visual Arts

7.4.7 Structure

Public galleries acquire, store (preserve) and present works of art and other objects of historical or technical value, to the general public. Individual items are grouped together to form exhibitions. The production process for galleries and museums relates the ability to create a visual experience to the special capacity of the building the extent of inventory, and the cost of preserving and protecting each exhibit. Clearly the number of exhibits on display can only increase until the point where proximity of locating encroaches on enjoyment of each work. The maintenance of inventories enables firms to add flexibility and variety to output.

In 1982/83 Statistics Canada's annual survey recorded 677 non-profit art galleries and museums which are accessible to the public. Of this figure 277 (34%) were located in Ontario. A survey of 59 Public galleries and museums in 1983/84, revealed that 2 organizations had revenues in excess of \$10M such that

their combined revenues represented approximately 27% of total revenue. Of the remaining 57 "firms" 21 had total revenues in the \$1M to \$10M-1 range and 33 had total revenues between \$100k and \$1M-1. Three firms had total revenues of less than \$100k. Examining the provincial distribution revealed that 21 of 59 organizations are located in Ontario and that less than 21 organizations accounted for 48.43% of total revenues.

The degree of concentration and monopoly power in this market is a direct function of the "product". The exclusive nature of the visual arts exhibited in Public Galleries and Museums (often there will only be one original of each item produced), automatically implies monopoly power, because each gallery or museum possess a unique collection. As with other areas of culture, the potential harmful effects of monopoly power are lessened when profits are not the control motive for the organization. Thus, the relationship between public galleries and museums is collusive in the general promotion of visual arts. The overall distribution of galleries and museums is closely correlated to the population distribution thus the geographical concentration in Ontario. The effects of geographical concentration are lessened by the ability to organize touring exhibitions, however, the mobility of exhibits is constrained by the cost of transportation; the delicate physical nature of certain works and the security costs associated with the great value of many exhibits.

The output of public galleries and museums can be thought of as purely a presentation of a range of visual art works for public appreciation, since exhibits are not for sale. There is a parallel here to the performing arts in that consumption is essentially an experience.

It is common for public galleries and museums to combine permanent and temporary exhibitions. To the extent that a large proportion of permanently exhibited works are regarded as "classics", galleries or museums are often identified in the eyes of consumers by reputation of their permanent collections. In this way, natural barriers to entry exist due to economies of promotion achieved by large public galleries. Furthermore, when collections contain works which are unique and original, there are absolute cost barriers to entry because if one gallery exhibits such a work, it does so to the mutual exclusion of all other galleries.

The growth of museums and galleries (as with other public aspects of culture) is represented by the increased supply or availability of visual arts, rather than demand-generated growth. The supply of galleries and museums in Canada grew substantially after 1945: 86% of galleries and museums were founded after 1945 and 45% were founded after 1966. The growth slowed down in the

70's with approximately 11% being founded between 1970-76. As concluded by Brice,⁵

"The growth of the Canadian museum (including galleries) sector seems to have followed the pattern of cultural activities in general, in particular as an effect of the recommendations of the Massey Commission in the early fifties."

The creative segment of the V.A. labor force show a trend of growth similar to that in the P.A. labor force. During the period 1971-81, the numbers of painters, sculptures and related artists in the "experienced labor force" grew 344% from 2,310 to 7,950.

Recent statistics for the years 1975-1983³ suggest that gallery and museum attendance has been relatively constant over the period and if anything has declined somewhat. However, the public museum or gallery role of providing exhibits for "consumption" is supplemented by the role of acquiring and preserving works in the visual arts. Since contemporary works considered worthless by today's consumer might be considered priceless by tomorrow's consumer there is justified cause for the government to indulge in what amount to artistic research and development. This has been accomplished through the creation of the "art bank" which accumulates the works of contemporary Canadian artists.

7.4.8 Conduct

While contemporary or unknown works struggle to find an appreciative audience, works of art which are considered "classic" by critics, consumers or both if supplied in the private market, will be priced efficiently. That is, the private market is efficient in discounting such that a rare masterpiece will exact a price that reflects its known future value. This situation defines an investment acquisition role for public organizations. The market for visual art treasures dictates that only a relatively small number of wealthy buyers could afford such works, however, the government as a buyer is able to acquire art treasures on behalf of the general public. Other buyers in this market are likely to be other governments, corporations, foundations or business syndicates.

In 1983/84, reported earnings from entrance fees and membership rose by almost \$1M over 1982/83 even though attendance fell slightly. This could reflect the insensitivity of demand for the viewing of visual art to prices. If this is so, then a higher price for admission would increase revenues without

reducing attendance proportionately. It is worth mentioning that many non-attenders of public galleries and museums may possess a demand for the "option" to attend at some future time. That is, the general public can be viewed as supporting the acquisition and exhibition of art works even though they do not consume them directly.

Private Sector

This section describes the structures, and the associated conduct, involved in the distribution of visual arts in the private sector. Distribution consists of the route, methods and processes by which visual art products are moved from creator to consumer. Two types of distribution have been categorized: private "for-profit" distribution involves the movement of the art in its physical embodiment through a market mechanism, and private "non-profit" distribution or display in which organization facilitate viewing of the art work with the visual component rather than the physical product being distributed and less emphasis placed on selling. The following are defined as commercial distributors: department stores; auction houses; itinerant vendors; private dealers and artist agents and specific wholesalers for the many miscellaneous outlets and retail art galleries. Non-profit distributors include artist-run centers.

Private, "Non-Profit" Distribution

7.4.9 Structure

There are approximately 45 artist-run centres with a visual arts orientation. These centers developed from the apparent need of artists to side step dealers and gallery owners who were seen as profiteering at their expense, to integrate art and technology and to provide space and focus for "new art". The regional distribution is as follows: British Columbia - 7, Alta. - 3, Saskatchewan - 2, Manitoba - 2, Ontario -17, Quebec - 9, New Brunswick - 2, Nova Scotia - 2, Prince Edward Island - 1. Artist run centers receive financial support from all three government levels. The bulk of the funding ultimately comes from the Canada Council. Provincial support varies; British Columbia and Manitoba are sporadic; Alberta, Saskatchewan and Ontario are considered "quite good"; Quebec is weaker; and the Maritime provinces offer virtually no support. Municipal support is generally weak. Private sector revenues in the form of memberships, donations and gate receipts account for approximately 1/5 of aggregate funds.

7.4.10 Conduct

Artist-run centres have already been noted as satisfying a need identified by the artists themselves. Sales are of

secondary importance. Centers see themselves as support structures for the artists. Therefore, centers "pay" the artists for using their works while following the "Canadian Artists Representation concept" of exhibition fees to exhibiting artists for the public use of their work. Half of the sales only cover portions of their total expense such as original production. Rather than engaging in competition, centers support each other in non-profit collusion. "Parallelogramme", a bi-monthly publication serves as the major communications mechanism advertising networking and promotional functions. With few exceptions artist-run centres are unaware of attention by either the commercial or public galleries.

Problems faced by artist-run centers are unstable funding, difficulty of rationalizing center benefits for fund raising purposes, artist fees, touring funds, inadequate physical space and lack of management training and experience.

7.4.11 Private, "For-Profit" Distributors

Structure

Department stores sell lower-priced mass-produced products to consumers whose main interest is compatibility of the art with their decor. Five or six auction houses sell artwork across Canada and act as a key price guide for art investors. Private dealers buy and sell on their own account or act as agent/ brokers between private buyers and sellers. Artists' agents represent one or more artists and help to get them represented at art galleries. Art consultants provide advisory services to buyers on a fee or commission basis. Interior decorators provide decoration packages that include artworks. Theatre lobbies, restaurants and cafés are also likely to display and sell art. Itinerant vendors act as extensions for retail galleries and sell from one or more places on an interim or temporary basis.

Art galleries are small, owner-operated which have few employees and do not use large physical facilities. They are concentrated in Ontario, Alberta and Quebec. Decreasing numbers are found in British Columbia, Manitoba, Saskatchewan, Nova Scotia, New Brunswick, Newfoundland and Prince Edward Island in that order. Galleries are found in major cities either clustered in the core-area or isolated in the suburban malls. Benefits of the former have been cited as being in a centralized area which attracts a) customers and b) casual observers who are exposed to artists work fulfilling an educational objective. The latter attracts tourists more than institutional buyers.

New entry is possible in the market as indicated by the young age of some galleries. A lack of statistics prohibits estimating dynamic turnover of firms within the industry. The presence of old established firms indicates long run profitability also exists. Barriers do vary with regards to the quality of galleries. Those dealing with high priced art have fewer but more loyal customers, special access to the supply side of the market and exclusive contracts with the best current artists. These factors make it more difficult to cultivate the supply of art works while problems of customer development make entry difficult. These difficulties are present at nearly all levels of artwork except at the low end where they are exclusively related to retailing.

Gross sales vary considerably from \$39,000 to \$1.9M. There is a degree of concentration in the industry with only one quarter of the total number of firms with sales above the average of the industry. An average gallery represents 23 artists and has sales of \$365,000 but the range is large with sales of \$39,000 (2 artists) to \$1.9M (90 artists). In terms of content it has been estimated that Canadians purchase $5\frac{1}{2}$ more times domestically-produced art than foreign art when they purchase from retail galleries.

7.4.12 Conduct

Information is again limited to retail art galleries. Business practices vary considerably from one group of retailers to another. The heterogeneous nature of their conduct implies that government programs or policies affecting the art market will have a different impact upon each of the numerous markets.

Individuality is the overriding theme in art galleries with owners and managers running their own shows according to their view of the world. Relationships between dealers and artists, while varying considerably, are nevertheless a buyer's market with more artists than galleries which are able and willing to show the works. It has been suggested the economically determined optimal number of artists a gallery can properly represent is between 20 and 30. Therefore, the number of effective galleries has a strong influence on the total number of artists who can get good market access and dealer's marketing skills.

Pricing policies are influenced by a number of factors and generally reflect the costs of production but is usually based on the reputation and previous success of the producing artist. Dealers rarely put art on sale (i.e., downward price movement is uncommon) but upward price movement in the selling price of an art work does occur. In addition to "visual arts products" some galleries also sell other products usually identified as "services"

such as restoration, conservation and appraisals. Hence, there is a limited degree of horizontal integration.

7.4.13 Emerging Environment

Commercial galleries and artist-run centers are the most significant distribution systems in Canada. Auction houses and private dealers' roles are increasingly becoming important especially for established artists and for secondary sales.

SOUND RECORDING

The sound recording industry is defined by firms engaged in the production and leasing of master tapes, and the release and sale of sound recordings mainly through production of phonograph records and prerecorded audio tapes. More recently, the production of compact laser disc and music videos have become important products of the industry.

7.4.14 Structure

The industry is comprised of 175 active firms with the majority of employees found in record label companies. There are over 60 active recording studios in Canada, and 5 active music publishers. At the distribution level, there are 14 branch distributors and 31 independent distributors, of which 22 are involved in "rack-jobbing", and 8 are included in retailing. There are some 3,000 retail record stores in Canada with the geographical concentration in Ontario and Quebec. In 1983, out of 103 surveyed record companies, 68 (66%) were located in Ontario and 24 (23%) were located in Quebec.

Those companies reporting revenue in the Statistics Canada Survey⁶ (94) grossed \$324M (in 1983) of which \$220M was a result of record or tape sales. The industry is highly concentrated and dominated by foreign-controlled companies. Out of 94 reporting companies, 10 foreign-controlled firms earned 82% of industry revenue, while the 84 Canadian-controlled firms accounted for the remaining 18%.

The production of several forms of sound recording characterizes horizontal integration for the major companies while their involvement in production, publication and distribution of the good indicates that they are also very vertically integrated. The larger companies do differ from each other in that some possess their own production facilities while others contract out to other companies. This suggests that further to the level of concentration, interdependence is strengthened by the reliance on each others' business or manufacturing capabilities.

Smaller, typically Canadian-controlled companies have had to specialize in either recording, publishing or production.

At the distribution level, it is not surprising that transportation costs are a significant factor in Canada. It is estimated that 25% of total shipments go directly from manufacturing plants to retail outlets while 68% is handled through rack jobbers. The remaining shipments are handled by one-stop wholesalers and mail order operations.

Retailing consists of 14 large chains specializing in sound recording and owned for the most part by recording companies and 30 smaller independents chains. This vertical integration by record companies increases their profits on average by approximately 46%. The majority of rack-jobbers, one drops and large chains are controlled by foreign interests.

The market for sound recordings has grown substantially in Canada, over the last 15 years. Between 1970 and 1977 total revenues increased 195% in real terms. Canadians are presently regarded as the highest per capita consumers of sound recordings in the world. Within recording formats, annual statistics show a steady rise in the production of cassette tapes since 1972. However, since 1981 record album production has fallen so that by 1984 the numbers of albums and tapes produced were almost equal at \$37M.

Government involvement in the sound recording industry is directed through the C.B.C. and is principally concerned with Canadian content. The C.B.C. arranges the production, recording, and manufacturing of selected Canadian artists and markets their work through its own broadcasting system, distributing promotional records to some 2,000 representative broadcasting organizations worldwide. The government also regulates the content of other broadcasting media in Canada through the C.R.T.C. ensuring that Canadian works receive some minimum attention.

7.4.15 Conduct

Markets exist in the industry both for the sale and for the leasing of master tapes, the sale of records, tapes and their sound recordings, subsidiary rights and royalties. To some extent the industry experiences a "peak load" capacity problem due to high demand usually prior to Christmas.

Large firms earn much of their income from "custom" sales, that is, the recording, distributing and retailing of material not associated with their own catalogue. This enables these firms to reduce the risk associated with their own material. Although recording studios are generally domestically-controlled by foreign interest (mainly in U.S.A.), and while the

degree of local autonomy in foreign subsidiaries in Canada varies from company to company, decisions concerning the development of export markets are more likely to be left to the parent company.

Small companies, particularly those with some degree of specialization in Canadian-produced material and recordings face a high element of risk, and limited access to distribution channels. The fact that on average, a minimum of 20,000 albums must be sold in order to break even, leads to financial weakness for these firms.

A number of factors accounts for the slow development of a Canadian recording industry. The cost advantage of leasing master tapes from large foreign-controlled companies over the production of original master tapes encourages such imports even in the presence of tariffs (described below). Furthermore, the additional cost of production, jacket design and advertizing which are incurred by the original producers of a master tape, thus encourage import and leasing rather than domestic production. The relatively small size of the domestic market and the obvious segmentation resulting from Canada's bilingual culture has served to discourage the creation of domestically-produced original music, particularly since financial institutions have been reluctant to provide financing for products which are viewed as having unknown value and a large risk. The incentive for performers is to sign a contract with a multinational company and to this extent (as already stated above) Canadians buy more "imported" Canadian content that that which is domestically produced. While Canadian content represented around 14% of the net sales of records and tapes in 1983, foreign-controlled firms earned more from Canadian content recording (\$18.8M) than did Canadian-controlled firms (\$11.4). Access to foreign markets is limited by the lack of access to distribution systems.

7.4.16 Emerging Environment

Since the industry imports the majority of its production equipment from Europe, Japan and the U.S. virtually all research and development has taken place abroad, and this has important implications for the future development of the sound recording industry in Canada. The most important trend emerging in the sound recording industry stems from technical innovations, primarily in the production of music videos and compact laser discs. The laser "compact" disc possesses the biggest threat to existing discs and tapes, and has an estimated potential to capture 80% of the world market. As mentioned previously, virtually no "R & D" has taken place in Canada. For this reason the domestic industry may suffer badly to the benefit of manufacturing countries. Presently, only 7 plants exist: 5 in Japan, 1 in Germany and 1 in the U.S. Already some foreign-controlled companies have reduced or ceased the production of audio-discs in Canada.

The success of popular music videos in both regular, cable and pay T.V. suggest that this format may supercede the sale and broadcasting of purely auditory products. This has implications not only for the sale of albums and cassettes, but also in the market for equipment to consume such products. To the extent that music videos have become an important part of marketing in the recording industry, its development represents an increase in promotion costs which the majority of small Canadian companies cannot easily absorb (the average cost of a music video ranges between \$30,000 and \$60,000). In 1984, the Canadian Independent Record Production Association formed "VideoFACT", a foundation providing financial assistance in the production of 20 music videos, however, it has been suggested that government attention should be paid to this area of development.

Other constraints to any future growth exist due to the difficulties companies have had in obtaining working capital. Banks have been highly reluctant to finance domestic companies which are generally small and have to rely on conditional agreements and advances in the face of high risk and long pay back periods.

7.4.17 International Environment

In 1977 Canada ranked 7th in terms of sales and 6th in terms of per capita consumption. Over the 1970-77 period exports rose 480% while imports grew 293% although in absolute terms exports represented \$2.9M compared to \$17.3M for imports. The bulk of the imports are likely to consist of deleted items for which Canadian demand was insufficient to warrant local manufacturing. This does not accurately reflect the level of international trade which includes the selling of publishing rights of which there is no record. Using royalties as a proxy, two Canadian societies saw royalties received from their affiliated foreign societies increase 174% from 1970-77. In this market Canada must compete with the U.S. which represents over half of the world market for records and tapes and is the home base and focal point for many of the industries multinational corporations. In 1983 the ratio of imports to exports stands at approximately six to one with export sales at the wholesale level amounting to \$8,200 while import sales were \$44,500.

There are a number of tariffs of concern to the industry. Among them are tariffs on equipment used in recording studios and record pressing/tape duplicating plants that must be imported because it is not available in Canada to industry standards. Another case is that master tapes are charged a duty of 15% on

the physical value of the tape only in instances where there is no selling price for the tape to the purchaser in Canada. If the tape is sold and the selling price exceeds the face value, the higher amount will become the value of duty. A segment of the industry feels that the importation of master tapes at face value instead of market value of its content is seriously disrupting the marketing potential of Canadian talent. However, the present system coupled with the relatively high tariff for finished product is promoting the pressing and duplication of foreign material in Canada.

FILM AND VIDEO

7.4.18 Introduction

The film and video market is defined as the production, distribution and exhibition of theatrical feature films and shorts; films and mini-series made for television; documentaries; educational and industrial films and television commercials. The industry has both public and private elements.

7.4.19 Structure

The film/video (F/V) production industry is characterized by a large number of small companies (479 in 1982), however, 31 firms account for approximately 66% of total revenues for the industry which amounted to \$160.5M in 1982.* In the same year a total of 1,876 films and 394 videos were produced in Canada (excluding T.V. commercials and filmstrips) of which 1,777 films and 375 videos were produced by private industry.

The film and video sector is more labor intensive than almost any other industry in Canada. The number of paid employees in F/V production totalled 1,446 in 1982, a slight decline from previous years. However, this figure does not take into account the large number of freelance employees who are an integral part of the production process. Salaries and wages, inclusive of freelance fees, totalled \$53.5M in 1982.

The production of F/V in Canada is financed from a number of sources including equity financing through individual investors; pre-sales financing from exhibitors or distributors fees; co-production financing through distributors or exhibitors financing production in return for rights (for example, H.B.O. has purchased the U.S. pay T.V. rights to 22 films prior to produc-

* Latest available Statistics Canada data.

tion) and specific contracts usually from U.S. major distributors in return for exclusive rights.

The number of organizations involved in providing production services to the industry increased their revenue by 192% between 1977 and 1982, to \$62.6M. This reflects to some extent an increase in production resulting from the capital cost allowance legislation (discussed below).

There is a high degree of vertical integration between production and distribution. Indeed, all the major U.S. companies integrate production and distribution under common control. Distribution companies are an important source of financial support to producers in addition to their role of supplying products to exhibitors. Distributors market and promote films and generally motivate the direction of commercial production through market feedback. The Statistics Canada survey in 1982 reported a total of 115 film distributors earning gross revenue of \$286M from the sale or rental of films and videotapes.⁷

The private F/V distribution market is dominated by foreign (mainly U.S.) controlled distributors. In 1982, 20 such distributors accounted for 73% of total industry revenues. There is a high degree of concentration particularly in the theatrical market with the 10 largest organizations who are involved in both production and distribution earning over 84% of total theatrical revenue. Canadian F/V accounted for 54% of gross revenues earned by distribution companies in 1982. However, the Canadian film production industry faces significant cost barriers particularly in the private theatrical film market where large U.S. companies have achieved scale economies and vertical integration into distribution networks. Both of these variables play a major role in the international film market.

There are several modes of exhibition which represent horizontal market for F/V distributors. These are: film theatres; conventional television (hereafter T.V.); pay television (hereafter pay T.V.) and home video. In 1982, 54% of distributors revenues were earned from the theatrical market, 31.9% was earned from television, 71% from pay T.V. and home video, and (non-theatrical sales and rentals made up the remainder). Typically, T.V. has paid relatively little as a proportion of production costs for exhibition rights, making the theatrical market of principal importance. However, the continual development of pay T.V. and home video markets is significantly changing the revenue flows and relative importance of these channels.

The exhibition of films is characterized by chain ownership concentration. In 1982 there were 1,542 indoor theatres of which some were multi-screen facilities, and 270 drive-in theatres.

The total seating capacity of film theatres is virtually unchanged from the capacity recorded in 1960. Movie theatres in Canada generated total revenues of \$444M in 1982. Famous Players and Odeon are the two major theatre chains in Canada and account for 65% of the seating capacity in six major cities, which constitutes the principle market for "first-run" movies. Thus, most new films are released through one or the other of these companies. While 83% of all regular theatres are Canadian-owned, they accounted for only 61% of total revenues in 1982.

Film attendance peaked in 1952 and declined rapidly until the early sixties following the growth of television sales. Since then attendance has remained level at approximately 90 million ticket sales annually. In 1982, 87.6M tickets were sold representing an average frequency of 4 visits per year for each individual aged 5 years and over.

Government involvement in the F/V industry has evolved from the creation of the National Film Board (NFB) which has produced films since 1939. In 1983, the NFB produced 280 films, videos and audiovisual productions and operated in 1984/85 with a budget of \$63.7M. The Canada Council allocates grants to individual and organizations involved in film and video production with \$2.5M being spent by the federal government through the Council.

In 1967, Telefilm Canada was created with the particular objective of encouraging the domestic feature film industry, through subsidies to encourage the development of projects and scripts and most other aspects of the market for films. Financial support is usually allocated in the form of a loan or equity investment. Since 1983 Telefilm Canada has administered the Broadcast Program Development Fund which promotes high quality T.V. in the areas of drama, children's entertainment and variety. In 1984/85 the Broadcast Program Development Fund received total direct federal support of \$54M, while direct expenditures on film were \$11M.

The introduction of the 100% capital cost allowance in 1974 was designed to encourage investors to finance films, shorts and videos. The production budgets of feature films and non-feature products certified under this incentive scheme increased very sharply between 1977 and 1979, peaking at \$180M and \$58M respectively. Thereafter, production budgets of feature films declined sharply and stood at \$11.1M in 1983 while non-features declined to \$13.7M. This decline would seem to reflect a loss of confidence by investors, particularly due to Canadian content requirements at all levels of production, distribution and publication, and an extensive amount of "bad press" in 1980.

Changes were made in 1983 allowing 100% CCA to be claimed over two years, however investor confidence remains low.

7.4.20 Conduct

Access to markets through large distribution companies has been difficult for Canadian films. Between 1977 and 1981, only 6 new Canadian films were handled by the large foreign-controlled distribution companies in Canada. Canada's cultural connections with the U.S. and Britain have made importing of cultural products from these countries an attractive and commercially successful option. Canadian F/V companies have had to face a problem of cultural product differentiation, or to some extent, a lack of it. In other words, the F/V industry has been presented with a dilemma which, on one hand, has encouraged the development of a differentiated "Canadian" product only to experience problems of access to distribution systems. On the other hand, the situation has encouraged the development of Canadian products presented in an American style in attempts to provide a more commercial product with very limited success. Since the major distributors are integrated with the major U.S. production companies and since Canadian production companies are generally regarded as part of the "North American" market by these major companies the concentration of market power presents an important structural barrier.

7.4.21 Emerging Environment

The growing importance of Pay T.V. and home video markets as exhibition channels for F/V products is likely to have a substantial impact on the industry. While little data is yet available, the Canadian Pay T.V. services, which were initiated in February 1983, may require as much as 1,400 of new Canadian programming by 1986.

The home video market is the most rapidly expanding channel for exhibition of F/V products. Statistics Canada recorded the number of households with V.C.R.'s more than doubled in one year, between 1983 and 1984. At present, over 1M homes are equipped with video cassette player/recorders. It is worth considering that the rapidly expanding V.C.R. market in Britain has caused such drastic reductions in movie theatre attendance, that Canada has replaced Britain as Hollywood's largest market outside the U.S. A similar expansion in Canada suggests that video distribution will assume an increasingly important role not only in the F/V market but also in the performing arts, visual arts and the recording industries.

7.4.22 International Environment

The problem of access to U.S. and foreign markets through the large distribution companies has already been discussed above. In Canada firms can reduce costs of penetrating new markets under P.E.M.D. Expenditures under this program for F/V were estimated to be \$150,000 in 1984/85. By way of comparison, Australian feature films have been relatively successful in gaining access to larger markets through large distributors. The Australian government has been aggressive in encouraging F/V exports through a rebate grant scheme which offers seventy cents on the dollar up to a maximum of \$100,000 on expenditures incurred in the development of exports. Eligible expenditures include advertising, trade fairs, overseas travel, release printing, dubbing, subtitling, freight and insurance. In addition, a companion program rewards improvements in export performance with cash grants.

The reported revenues of production companies in Canada from foreign markets totalled \$18.7M and revenues accruing to the distribution of Canadian F/V abroad totalled \$184,752 in 1982.

BOOK, PERIODICALS AND NEWSPAPER PUBLISHING

7.4.23 Introduction

Books, periodicals and newspaper publishing combined can be defined as the "print media" industry, which exhibits a number of characteristics which are common to each of the three segments, and which deserve a more general treatment. Print media products all require the authoring of written material; printing and publishing of the newspaper, periodical or book and distribution to the readers.

At one level, the Canadian industry reveals a large number of small book publishers and weekly newspapers/periodicals with small circulations. The start up of new companies each year is evidence of ease of entry, yet the somewhat dubious profitability of these companies and the continued importance of government support at this level indicates some problems which have stunted the growth of the industry.

At another level, many large firms which are mostly foreign-controlled, are vertically integrated both forward from publishing to distribution and in some cases, backward to printing and manufacturing. These "media conglomerates" are diversified not only in all aspects of print media, but also in film making, radio television, and non-media activities. With these

firms, an authored work will benefit from very large economies of scale in production, promotion, and scope. One work can be packaged, sold and resold in the various segments of the media industries. Technical advances in computerized database storage have facilitated this process and have enabled such firms to purchase "first North American publication" rights plus database storage rights; accomplished at minimal costs to the publisher. Computer and telecommunications technology have enabled the development of highly efficient distribution systems, thorough telecommunications and provides faster stock information and delivery.

Tele-distribution systems such as telebook in Canada have enabled Canadian firms to compete more effectively with the U.S. conglomerates. While the presence of such large conglomerates represents the importing of concentration from the U.S., a few large Canadian-owned firms have diversified and integrated their operations, such as Maclean-Hunter, Torstar and Southam.

The distribution systems in print media although varied have some common characteristics. Forward vertical integration into distribution is particularly evident in periodicals, paperbacks, and newspapers and represents concentration at the production and wholeselling stage of operations. In all markets, distribution involves complex return systems which offer generous return to retailers. This aspect of distribution means that retailers often act more as agents to publishers.

To the extent that the industry supports the existence of both small and large firms, outside market influences such as government policy in this area is likely to elicit different results from each group of firms. Thus, the selective identification of policy targets is an important element of government involvement. Print media firms are protected and regulated by several forms of legislation and financial support, such as the foreign investment review act; Bill C-58 (deductability of advertising expenditures; provincial regulations on distribution; federal grants (Canada Council, SSHRC) Provincial Grants, and tax exemptions (F.S.T.)). Government subsidies and legislation are particularly evident in non-profit markets for published material, such as Canadian literary arts and academic works. Public access to published material is maintained through the library system. In 1983 the revenues of libraries totalled almost \$416M of which 69% was supplied by local governments and 22% by provincial governments.

Periodicals and Newspapers

7.4.24 Structure

The periodical and newspaper publishing industry involves a similar process to book publishing but also exhibits significant differences. Authored work reaches the consumer by way of publishing companies, printing companies, distribution companies, wholesalers and retailers. In 1983, 124 daily newspapers, 1,154 non-dailies and 974 periodicals were published in Canada. These figures exclude non-commercial activity such as academic, religious or government publications. In the same year, some 5.6 million copies of daily newspapers were sold each day of which approximately 82% were English-language papers. In addition, 1,100 non-daily newspapers had combined per issue circulation of over 12 million copies in 1983. One variable which differentiates print media products is their relative value over time. The extremely perishable nature of daily newspapers requires that they be available for consumption theoretically as soon as they are produced. This is true also to a lesser extent for periodicals. The time value of newspapers particularly has created, through necessity, extremely efficient distribution systems. Daily newspapers reach the consumer through two main outlets: retail stores/news-stands and home delivery.

The two main sources of revenue for newspapers and periodicals are sales revenue and advertising revenue. In 1982, advertising revenue accounted for 78% and 76% of daily newspaper revenue and non-daily newspaper revenue, respectively. The daily newspaper industry is characterized by high concentration with four ownership groups controlling 65% of the circulation in 1980. The two largest ownership groups; Southam and K.R. Thompson combined, owned 55 of 118 daily newspapers reported in the Statistics Canada annual survey. These 55 dailies represented 48% of the total average daily circulation in Canada. Periodical publishers are less concentrated with the top four publishers accounting for 20% of total single issue circulation in 1983.

The market for daily newspapers has seen a slight leveling off since 1982. Prior to this average daily circulation has grown steadily since the early 1950's, however, the growth in average daily circulation has not matched the growth in adult population. This is explained to a large extent by the emergence of electronic media, in particular, television which has had a strong impact on the newspaper industry.

Periodicals differ from newspapers and books in the time value of the product. Periodicals are produced usually on a regular weekly basis and contain a number of different written articles and pictorials in addition to editorial content. The time

value of periodicals permits "second hand" markets to evolve. These are costly to publishers, who have tried to undermine them by encouraging retail returns.

In distribution, periodicals differ in their use of the postal system, as a direct channel from publisher to reader. This system is subsidized by the Federal Government at a cost of approximately \$53M (1983/84). However, this mode has been of increasing importance to the publishers of controlled circulation magazines which are delivered "free" to a large but select market. The issue here involves a distinction which Canada Post made in 1969 between paid for and free material, the latter costing more, thus representing a competitive disadvantage to those publishers.

Other forms of distribution involve national distributors (both foreign and Canadian controlled), and local wholesalers. The Canadian Periodical Publishers Association acts as a national distributor on behalf of its Canadian members. For retail distribution, national distributors and wholesalers receive 30% of the cover price of a magazine. Another 20% is from the printer to the distributor. Thus, retail sales are not as profitable as subscription sales.

7.4.25 Conduct

Newspapers compete with each other and also with electronic media. While price competition is not evident, product differentiation is, and this can be linked to the fact that newspapers and periodicals are joint products with two distinct markets: the market for readers and the market for advertisers.

There has been increased competition in the provision of news from regular and pay T.V. networks. In particular, Pay T.V. channels offering continual (24 hr.) specialized programming such as sports, news, and financial information make it almost impossible for newspapers to be the providers of "up-to-date" information. Diversification of content has led to relatively more "magazine style" commentaries. In marketing strategies, tabloid form newspapers have been successful in targeting and catering to a particular market, not only through content but through changing the physical appearance of the product.

Advertising is the major source of revenue for newspapers and periodicals. Advertising revenues are correlated with the demographics of readers and more importantly, to circulation. Thus, there has been much attention focused on increased circulation and reaching target groups of readers. Some non-daily newspapers charge no price, earning all their revenue from advertising. The provision of news or other editorials in these publica-

tions is minimal, with the bulk of the content being in the form of the advertising itself.

In Periodical publishing, special interest periodicals compete by targeting particular groups of consumers and maximizing circulation for those groups. Since circulation is key to advertising, variables such as changes in postal rates which increase the costs of distribution are likely to affect advertising revenues indirectly, depending on whether any cost increases can be passed on to the reader as opposed to the advertiser.

Canadian publications are protected in the advertising market from "overflow" American periodicals by government regulation which allows a maximum of 5% Canadian advertising in foreign publications. In addition, the income tax act disallows advertising costs as tax deductions for advertisements in foreign owned periodicals aimed at the domestic Canadian market.

7.4.26 Emerging Environment

Advances in technology have lead to the provision of information in electronic media by newspapers and media conglomerates. Systems such as teletext and videotext developed in the U.S., far from representing a threat to newspaper publishers, represent an integration across media formats as discussed above. As these systems develop, regulation and monopoly power are likely to be contentious issues.

Book Publishing

7.4.27 Structure

Statistics Canada recorded 202 publishing companies operating in Canada in 1982, of which 65% were active in publishing only, and 35% reported some degree of vertical integration, operating both as publishers and distributing agents. In addition, 34 firms were reported to be operating exclusively as agents. English-language publishers accounted for 129 out of 202 in 1982, (64% of the total reported in the survey) and of the 202 companies 174 (86%) were Canadian-controlled. However, although the great majority were Canadian, 73 of these companies (42% of Canadian companies) reported net sales under \$200,000. Taken as a whole, the sales of Canadian-controlled publishers in 1982 accounted for less than half of total sales.

The industry is concentrated with the majority of large firms under foreign control, while the majority of Canadian controlled firms are small or medium sized. The industry also exhibits geographical concentration with 82% of publishers located in Ontario and Quebec.

Due particularly to the number of small Canadian publishing companies and the limitations of market size, the industry is characterized to a large extent by high fixed costs of printing which cannot be defrayed by high volume print runs. The resulting high unit costs of production greatly affects the profitability of publishing. Correspondingly, the size of the U.S. market enables large American publishing corporations to achieve scale economies in production and promotion which are not feasible for Canadian firms, under present market conditions.

The size of the book market in Canada has been estimated at \$1.2 billion in 1983. Figure 19 shows a real growth in total sales for the period 1975-1983.

Figure 19
 Estimates of the Canadian Domestic Book Market
 Domestic Sales at first point of delivery
 of all books

YEAR	\$M BOOK SALES (constant 1971 dollars)
1975	347.12
1976	359.53
1977	374.01
1978	396.64
1979	432.75
1982	435.47
1983	454.45

Source: Statistics Canada, 1983, Catalogue 87-001.

The figure shows a steady real growth over the period although real sales did level off in the period 1980-81 (statistics are unavailable for 1980/1981 at time of writing).

Federal government subsidies to book publishers totalled \$8.7M in 1983. Provincial governments and arts councils gave a total of \$2.6M.

Books Published in Canada

Of those books published in Canada, tradebooks and textbook markets assume almost equal importance in the English-language market earning sales of \$99.3M and \$101.1M respectively in 1983. Secondly, technical and other books earned sales of \$42.8M. In the French language market, tradebooks, textbooks and scholarly

technical books earned sales of \$23.4M, \$30.1M and \$13.6M respectively. Over 8,600 titles (of which approximately 66% were new) were published in Canada in 1983, and of the new titles, approximately 3,292 (58%) were by Canadian authors.

The Domestic English Language Market

While the tradebook domestic market is shared almost equally between Canadian and foreign-controlled firms, the domestic textbook market is dominated by foreign-controlled companies commanding approximately 66% of the Elementary/High School market and 76% of the post secondary market. The general reference market is heavily dominated by foreign-owned companies with 85% of the market shares. English language publishers receive revenues from the following major sources: sales to educational institutions (31.2%); bookstores (21%); direct sales to the general public (21%); exclusive agents and wholesalers (13%); libraries (3.7%) and book clubs (2.6%).

Domestic French Language Market

Unlike the English language market, French language publishers are dominated by Canadian-owned firms representing 82% of the market. The French language market also accrues its revenues, in contrast to the English language firms. This is largely due to provincial government legislation requiring all public institutions to purchase their books at accredited bookstores. In this way, publishers received 42.3% of their sales revenue from retail stores, 80% of this amount comes from accredited bookstores.

Distribution and Retail

In addition to many publishing firms achieving vertical integration into distribution, chain bookstores have become increasingly important in the retail market and have provided much competition for "independants" who have responded by diversifying into wholesaling. Coles remains as the only Canadian-owned retail chain and is vertically integrated as a publisher.

Until recently, Canadian-owned distributors were at a competitive disadvantage with larger U.S. firms who have achieved economies of scale through the technical development of tele-information systems. This enabled these firms to provide faster stock information and delivery. However, through the development of the Canadian Telebook Agency (CTA), Canadian-owned distributors can provide an equivalent system. The CTA is funded by the Book Publishing Development Program.

Partly for the reasons of scale barriers and market size already discussed, medium and small-sized Canadian publishing companies have been characterized by weak financial perfor

mance. Most of these firms rely on government support to stay in operation. Large Canadian firms have been shown to be profitable even in the absence of government grants, however, some divergence of opinion about the profitability of these firms exist as a result of conflicting studies. In addition to the problem of access to financing, Canadian publishers have also faced problems of poor management, a lack of diversification and a lack of effective promotion and marketing. Development in these areas would help achieve a greater degree of efficiency, and the strengthening of both domestic and world markets.

7.4.28 Emerging Environment

In the textbook market, it is possible that structural changes in education curricula such as those taking effect in Quebec and Nova Scotia will enable Canadian publishers to attempt some new product development and promotion in an effort to gain a stronger market share. Any such changes which encourage more dynamic and aggressive marketing may yield spill/over effects to other markets.

7.4.29 International Environment

On the export side, the Canadian publishing industry has made only a small impression on the world market. Only in the area of English language tradebooks can exports be regarded as significant, due almost entirely to the success of Harlequin Books.

In 1983, imported books sold in Canada accounted for 75% of all sales. Imports accounted for 55% of foreign-controlled publishers not domestic sales and 34% of Canadian-controlled firms not domestic sales.

FOOTNOTES

1. See E.G. West (34).
2. Non-profit organizations P.A. firms are registered as charities for tax purposes.
3. See the Canada Council, survey of Arts Audience Studies (8)
4. The Federal Cultural Policy Review Committee, Louis Applebaum, Chairman.
5. See "A profile of the Museum Sector in Canada" (3).
6. Bradley, Iris M., DOC, Arts & Culture Sector, Distributing Visual Arts in Canada, May 1983.
7. Contained in "Arts and Culture: A Statistical profile" (17).
8. See Statistics Canada (20).

NOTE:

Numbers in parentheses refer to listing in the bibliography on the cultural industries.

7.5 **INFORMATICS**

7.5.1 Introduction

The informatics industry is considered by Statistics Canada as having two main categories, computer services and computer industry. The Computer services includes processing services, input preparation, systems development services and maintenance, and consulting services; while the computer industry includes production and rentals of computers and peripherals, sales, lease and rental of computers and computer-related goods either manufactured in Canada or purchased for resale. However, such a division is not easily established because there is considerable overlap which is increasing with the evolution of the industry. Consequently, different organizations use different definitions. For example, a report by Price Waterhouse Associates¹ defines the industry as the supply of equipment, software, systems and services for the electronic processing, storage, and retrieval of information, both in the form of data and text.

Statistics for the computer industry segment are included in the figure for the manufacturing industry, but are not broken out separately for the informatics industry. As within the informatics industry, there is also considerable overlap between the computer industry and other communications industry. The informatics industry will therefore be discussed as a single entity although the statistical highlights are given for the service segment of the industry.

7.5.2 Structure

The computer industry in Canada is dominated by foreign-owned companies such as IBM Canada Ltd., Amdahl, Digital Equipment of Canada Ltd. (DEC), Four-Phase, and Hewlett-Packard (Canada) Ltd. A survey conducted by the Department of Communications in 1983² shows these five companies as the predominant suppliers by number of installed units. Although these firms have tended to maintain this market dominance on an annual basis, IBM and DEC are the top two firms in terms of revenues as reported by Evans Research Corporation (ERC) for 1982, 1983 and 1984.³ The next three firms listed in the report are Control Data Canada Ltd., Burroughs Memorex Inc., and NCR Canada Ltd. The eight firms are all owned by multinational companies with head offices in the United States and are all primarily hardware suppliers. The top three Canadian-owned companies are AES Data Inc., Canada Systems Group (CSG) and Crowntek Inc., ranked ninth, tenth, and eleventh respectively by ERC. Of these three companies, AES is a hardware supplier but CSG and Crowntek are both service bureaux.

Although there are Canadian equipment suppliers like AES and GEAC, it is really in the software and service bureau areas that Canadian companies have concentrated. Price Waterhouse Associates indicated that Canada is relatively self-sufficient in terms of service bureau business and custom software development. The same is not true of packaged software where there is a large, and probably increasing trade deficit. Evans Research estimates that there are as many as 1,000 software firms in Canada, but half of these firms are very small and together account for less than 2 percent of the total market. On the other hand, 77 percent of the market is accounted for by the 53 largest suppliers. In total, Canadian-owned companies accounted for 80 percent of the computer services revenues in 1983.

Service bureaux started in Canada in the 1960's as a method of making large computer power available to companies which could not afford their own systems. This side of the informatics industry is less concentrated than the equipment side, and is largely Canadian-owned. In both 1983 and 1984, the top five service bureaux accounted for just over half of the market and are all Canadian-owned companies. In total, Canadian-owned companies accounted for 80 percent of computer services revenues.

Manufacturing of informatics equipment is somewhat limited in Canada and tends to be focussed on standardized products, but the imports of equipment give rise to extensive marketing and customer support activities. One important factor in the demand for hardware is the fact that various categories of equipment tend to complement each other. For example, the growth in desktop computers leads to a demand for access to corporate databases on general purpose mainframes. Manufacturers of peripherals have found this area to be more competitive than the market for mainframes because technical and compatibility problems are not as significant as if different types of mainframes are used.

7.5.3 Conduct

A very high proportion of informatics equipment produced in Canada is exported. DRIE has derived figures from Statistics Canada publications showing that the proportion of exports was 93 percent in 1983. At the same time, much of the Canadian equipment market is supplied by imports. This apparent anomaly reflects the fact that both sales and production of equipment in Canada are dominated by multinationals whose activities are planned on a North American or worldwide basis, and who often use Canada as a source for North American or worldwide markets rather than just meeting domestic need. Canadian subsidiaries may be given a "world mandate" for a specific product by their multinational parent, but even in such cases large firms often have at least two sources for a product in order to protect against supply interruptions. Canadian-owned firms, such as Electrohome, Comterm,

Norpall and Ahearn and Soper, tend to concentrate on less sophisticated products such as terminals.

For multinationals, the labor costs in Canada are reasonably attractive because of the exchange rate, but they are far lower in countries such as Taiwan and Malaysia. It has been suggested by spokesmen for multinationals that the main reason they manufacture in Canada is to be good corporate citizens.

Because informatics equipment has a high value/weight ratio, it would seem that plant location divisions could be influenced by subsidies. However, in reality, there is a strong tendency for high technology firms to gather in locations such as the Kanata area. This is partly because new firms are often formed by personnel from another larger firm or research laboratories already in the area. Another strong factor favoring the Ottawa area is the fact that federal government is a major customer, particularly for software developers.

There is a growing diversity of both informatics products and customers, which is reflected in complex and changing marketing channels. Changing equipment, particularly the introduction of smaller computers and the associated reduction in price, has virtually eliminated the original reason for the development of service bureaux. These firms have had to adjust accordingly and now offer services such as the use of specialized software and access to database in order to continue to grow.

For companies that purchased their own hardware, such ventures were major capital investments, and sometimes risky investments. This caused EDP departments to conduct large studies to justify such expense, and the selection of suppliers was considered to be a complex technical matter. Manufacturers met this situation by employing large, well-trained sales staff. Once hardware had been purchased, considerable customer loyalty developed in order to avoid the complications caused by the use of different mainframes. Further, the software, often custom-developed at great expense, is rarely directly transferrable among mainframes of different manufacturers. The users also have a better feeling if peripherals are sold and serviced by the mainframe manufacturer, even though other suppliers may have compatible units that are cheaper. Thus terminals, for example, are generally chosen as part of a larger system, or for their accessibility to an external service, rather than as an independent decision.

These factors, coupled with the rapid changes in technology, size of investment, and need for service and support, have caused purchasers to be very careful in selecting a supplier. Therefore IBM was able to maintain its strong market position which had been established through superior sales and services.

Systems software has generally been purchased from the equipment manufacturers to ensure the suitability of the system software. Equipment suppliers also had application software available, but it was more often developed by in-house groups or contractors, with contractors being more commonly used primarily because of the high salaries and rapid turnover of in-house EDP personnel.

The demand for application software packages has grown with the growth in the number of mainframes in service and the increasing number of smaller computers. Smaller organizations, particularly those using microcomputers, have generally purchased developed and proven packages rather than incur the costs, delays, and risks associated with the development of their own software.

The advantage of purchasing standard application packages, such as accounting for example, have also been recognized by large organizations. One reason for this is the cost of maintaining existing application software. As the number of these programs increases, the systems development and maintenance costs increase. Limited budget and the difficulty of getting and keeping people have caused systems departments to re-assess the situation and consider alternatives to the use of in-house development. The attractiveness of packages is enhanced by the fact that they are maintained by the supplier.

Therefore, it is logical that companies concentrate their limited development resources, both personnel and contract dollars, on industry or company-specific applications. By the same token, software houses are increasing their efforts at developing "vertical software" designed to meet the specific application needs of market segments such as hospitals.

The integrated office concept has had an effect on the informatics industry. Word processing systems were developed as stand-alone systems that replaced typewriters. As these systems became more common in offices and the use of data processing equipment (particularly microprocessors) increased, there has been a growing recognition of the need for communications to provide access to both corporate databases and external information services. The information, whether data or text, is normally processed and there is a requirement to communicate the resulting data and/or text. This has led to the growth of local area networks (LAN's) which connect various devices and systems together. With such a growth there is a concern for the standardization or compatibility of equipment withing the LAN in particular and the organization in general. As an example of this approach, AES Data indicates that it is now concentrating on selling integrated word and data processing systems to support work groups within organizations. This approach has met an increasing level of client interest and sophistication in recent

years. Integrated systems, however, generally do not cater to a single customer because most organizations do not have a single authority responsible for data processing, office automation, and voice communications. As a result, new technology may cause changes in organizational structures.

The demand for the original major product processing cycles has had a slow growth resulting in a continuing process of mergers, rationalization, and diversification. Such activity also provides an environment which increases research and development, a fundamental part of a high technology industry such as informatics. Price Waterhouse Associates have indicated that informatics equipment manufacturers are increasing their research and development expenditures directly as a percentage of sales. Research and development in product improvements is critical because of the intensive international price competition, although research and development is commonly thought of in terms of new products. More recently figures are not available, but it was estimated that in 1982 IBM Canada spent \$35 million in the operation of its research laboratory in Toronto. This was primarily for software development and seems like a very large figure, but in fact was less than 2 percent of the firm's worldwide expenditure on research and development.

There is, of course, a degree of risk in informatics research and development as is evident from IBM's decision to cut back work on Josephson junctions. Similarly, Burroughs has withdrawn from optical storage research and Storage Technology Corporation has cancelled plans to build a mainframe computer.

By the same token, investments in research and development must be capitalized quickly. Consequently, new products must be put on the market as fast as possible in order to take advantage of any lead over competitors. This pressure can lead to premature announcements with intended new product delivery schedules which cannot be met. It can also lead to design mistakes, such as the initial keyboard of the PC, and the release of equipment or software that has not been fully tested. This type of problem can be very serious, but the failure to market a new product in a timely manner can be disastrous. Carrying out research and development is thus very critical, with the most critical resource, particularly for software development, being skilled people.

Government generally provide considerable support to research and development, and the level of support within Canada compares favorably with that of other industrialized countries. However, CADAPSO has expressed concern about inconsistencies among Revenue Canada offices with respect to the definition of software development eligible for treatment as research and development activity.

7.5.4 Emerging Environment

As the cost of informatics equipment goes down and the performance goes up, there is a radical change in demand. The equipment is no longer used exclusively by only EDP departments within corporations. Microcomputers and word processing equipment are being purchased for use by individual managers at lower levels in large organizations.

The growth of the home computer market has not developed as anticipated. Until recently there was great optimism toward this market, encouraged to a large extent by the popularity of computer games. It appears that computers for the home market were produced before the market was established, i.e., a product looking for a reason to exist. This has caused an oversupply which has resulted in financial problems for companies such as Atari, and the complete withdrawal of others such as Timex. As another example, Nabu had an innovative approach to home computers but was unable to attract customers.

In general, apart from the home computer field, the informatics market is growing, in both mainframes and even more so in smaller computers, and the growth has been accompanied by an increasing demand for application software packages. Developed and proven packages are preferred by most users, but particularly smaller users, because of the costs, delays, and risks involved in the development of custom software. Although software has traditionally been a relatively small part of the world market, Price Waterhouse expects that it will be the fastest growing category and will rise 3.5 times as high a dollar value and twice as large a proportion of the world market by 1988.

There are several significant barriers to maintaining growth in the informatics industry, particularly for small Canadian equipment manufacturers. The nature of the industry is such that it depends to a large extent on characteristics of the technology, particularly the high research and development costs. The need to amortize such fixed costs means that the market must be as large as possible, at least continental and preferably global. Small firms are frequently not able to market on this scale and therefore are at a disadvantage. Another barrier is the speed of technological change which requires continual research and development with the inherent uncertainty and cost. At the same time, production costs must be kept to a minimum in order to meet the intense competitive pressures. IBM, for example, considers this a major element in maintaining its dominant position. A further barrier to growth is the tendency of purchasers to look for reliability, service and support, and compatibility with past or future purchases. There is also the problem of financing, which is difficult for any growing company, but particularly a company in a high-risk industry such as informatics. Growing companies

also face organizational problems during the transition from a small owner-managed firm to a larger enterprise requiring more professional management. Canadian firms that have apparently experienced this problem are Mitel, Systemhouse, and Comterm.

Three growing fields that may offer opportunities for Canadian firms are application software packages, courseware for education and training, and on-line information services. Of course, these niches may expand, disappear, or continue as narrow but potentially profitable fields.

7.5.5 International Environment

Canada has a large trade deficit in the informatics industry. Statistics Canada figure for 1983 indicates that imports of office and store machinery were just over \$3 billion while exports were just over \$1 billion, giving a trade deficit of nearly \$2 billion.

The similarity of business practices and the prevalence of multinational corporations produce very similar characteristics of demand, particularly in the informatics industry. End-user industries, such as banking and insurance, however, do have somewhat different requirements because of government regulation. Also, end-user industries based on resources have greater relative importance in the Canadian economy.

The issue of marketing channels may be the key to success for small Canadian equipment and software producers who hope to sell on a North American scale. In order to reach the U.S. market, it would appear that Canadian companies must establish a presence there, either by establishing an office or using a local distributor. The establishment of a U.S. sales office is expensive and the cost may compel small Canadian companies to rely on distributors, at least initially. Software suppliers can enhance their position by arranging for referrals from hardware sales, lend credibility to the software supplier, and reduce software marketing costs. One example of this approach is the case of Hewlett Packard and Cognos. Any reduction in marketing costs, which average five times as much as development costs, is of course significant, but strength in marketing is still necessary as emphasized by those attempting to form associations of small Canadian software producers.

FOOTNOTES

1. Price Waterhouse Associates. Environmental Assessment of the Telecommunications Equipment and Inforamtics Industries in Canada, Final Report, January 1985 (prepared for the Department of Communications).
2. Department of Communications Industry and Economic Development Branch, Technology and Industry Sector. The Supply of and Demand for Computer/Communications Equipment. December 1983.
3. Evans Research Corporation. EDP In-Depth Reports, Vol. 14, Nov 6, The Top Computer Companies in Canada. June 1985.

7.6 Space

The space sector is defined as consisting of three sub-groups: systems operators and service suppliers; equipment manufacturers; and the government. The discussion of the government involvement and contribution to the space industry is incorporated within section 7.6.1 System Operators and Service Suppliers and section 7.6.4 Equipment Manufacturers.

The Department of Communications is involved in space technology and its application within the overall federal government space policy and planning activities coordinated by the Interdepartmental Committee on Space. As it is recognized by those active in the sector, space technology has an immense growth potential. Commercial viability in many space-related fields, of which communications is a component, "provides the opportunity for the creation of new industries, the provision of new and improved services, and the establishment of substantial numbers of new and challenging jobs.¹ Within this context, the space sector is a recognizable unit with unique characteristics, while encompassing elements of the telecommunications, broadcasting and cable, and informatics sectors.

SYSTEMS OPERATORS AND SERVICE PROVIDERS

7.6.1 Structure

The Canadian space industry systems operators and service suppliers component is essentially made up of two corporate entities: Telesat Canada and Teleglobe Canada.

The role played by Telesat Canada in conjunction with the telecommunications carriage industry is discussed in point 7.2.2. Telesat Canada was created by a 1969 Act of Parliament to operate Canada's domestic satellite telecommunications system. The company is jointly-owned by the Canadian Government (50%), Bell Canada (25%), other Telecom Canada companies (16%) and (9%) by common carriers, and is subject to regulation by CTRC. The company's operations consist primarily of providing network television, telephone, and business communications services. Telesat Canada owns and operates the Anik series of satellites.

Teleglobe Canada is Canada's international telecommunications carrier. A federal crown corporation which establishes, maintains, and operates Canada's external telecommunications services and coordinates their use with the services of other countries. For a discussion of the role played by Teleglobe Canada as a provider of telecommunications links via submarine cable and satellite facilities overseas, see point 7.2.4. Teleglobe Canada

is the Canadian member of the International Telecommunications Satellite Organization (INTELSAT) and the International Maritime Satellite Organization (INMARSAT). INTELSAT operates a global public telecommunications satellite system, while INMARSAT provides international maritime satellite communications services, e.g., provides communications to ships at sea. Teleglobe Canada's share of Intelsat and Inmarsat revenues in 1983-1984 reached \$13.7 million (an increase of 23.4 percent from the previous year). This represents 3 percent of the corporation's overall operating revenues.²

The provincial distribution of revenues for both corporations is detailed in Table 7, p.60. As a national firm, Telesat Canada ranked 12th overall in terms of telecommunications revenues and this secured it a 5 percent share of the market within its revenue group. Of the \$109 million, \$64.2 million was contributed through the Federal government's Space Program, that is, revenues accrued from the lease of time on all Anik satellites by all customers. Teleglobe Canada, which ranked 9th overall in telecommunications revenues, generated earnings of \$210.4 million in 1983-1984 representing an increase of 15.9 percent over the previous year (\$173.8M).

In the context of the space systems operators and service suppliers, Telesat Canada and Teleglobe Canada each have a monopoly in their respective domestic and international markets. The overall effect of government ownership and operation of these two companies is tight control over the development and application of satellite technology and services in Canada. This structure is quite dissimilar to that of the United States where, in a deregulated environment, some 15 satellite carriers provide shared and private satellite services under an "open skies" policy.³ However, current economic prospects and government pronouncements tend towards the support of innovative, widespread use of competitively-priced satellite communications technology and services in Canada.⁴

7.6.2 Conduct

The conduct of the space systems operators and service providers is determined largely by the federal government's ownership and operation of Telesat and Teleglobe and by the regulatory role played by the CTRC in the affairs of Telesat. There is, however, no single source of a clear and complete statement of government policy on the use of satellites in Canada.⁵ The Telesat Act stipulates that Telesat should be a complement to, rather than a competitor of, the telecommunications carriers; as a carrier's carrier, it may lease satellite capacity to the common carriers, such as CNCP, the telephone companies, or broadcasters, but cannot lease to end-users of telecommunications services. It may lease partial channels to approved common carriers on request,

but may only lease full channels to broadcasters. Both Telesat and the common carriers may be licensed to own and operate transmit/receive earth stations in the 14/12 GHz band (that is with Anik C), but only Telesat may own and operate transmit/receive earth stations in the 6/4 GHz band (that is, with Anik D). Common carriers and broadcasters may lease transmit/ receive earth stations from Telesat and all other users must lease from a common carrier. As noted earlier, the federal government has commenced a comprehensive review of the role of Telesat Canada vis-à-vis other telecommunications carriers which is due for completion in 1985-1986.

Telesat Canada service rates are aimed at guaranteeing the corporation a 13.4-14 percent rate of return for the purchase, construction, launch, operation, administrative and other costs of the Anik series of satellites. Telesat requires a different regulatory approach to that of other CTRC regulated companies, for example, the telephone company regulatory approach, because of the unique character of Telesat which has a small customer base, a limited number of services, and large, cyclical capital investments. Separate rates are charged for individual services based on a "value of service concept" which in turn is based on the choice of channel leased, e.g., full period protected channel, partial channel, or occasional, unpreempted channel. However, Telesat is currently gravitating toward a universal flat rate concept for combined services in the hope of recouperating costs previously underestimated or to rebalance costs for unrealized forecast estimates.

Teleglobe Canada for its part provides full telecommunications services ranging from telephone, telegraph and facsimile services to transmitting radio and television programs. The cost is based on a weighted single fixed payment averaged for each particular service and all parties (domestic and foreign carriers) negotiate agreements to their mutual benefit. Teleglobe, basically, considers three factors in determining its rates:

- i) its payments to remit domestic carriers for handling the Canadian portion of the services;
- ii) its payments to remit overseas carriers for their part in handling the foreign portion of the services; and
- iii) its operating costs.

Another determinant of the conduct of these two corporations within the telecommunications and broadcasting market, is the state of the industry technology. For example, as a result of a satellite earth station technology which has advanced it to a stage where these systems are now smaller, cheaper and more powerful; the government changed its policy on earth station

licensing which now makes satellite service available to more Canadians. Technology and policy changes now allow individuals to own and operate receive-only earth stations (TVRO's) for their own use without a license from the Department of Communications. Moreover, broadcasters and cable TV systems may operate earth stations without a radio license--provided the CRTC has approved the distribution of the signals received from Canadian satellites.⁶ Additionally, the launching of the Anik C-2 and D satellites permitted a significant increase in the range of services available from Telesat and, quite possibly, will encourage the increased use of services by a great number of users.

Figure 20
Total Space Program Expenditures
 (millions of budget dollars)

<u>Program Area</u>	<u>81/82</u>	<u>82/83</u>	<u>83/84</u>	<u>84/85</u>	<u>85/86*</u>	<u>TOTAL</u>
Technology Development	38.8	45.0	50.9	44.1	60.3	239.1
Remote Sensing	26.3	39.1	37.4	48.3	73.5	224.6
Communications	19.8	25.8	25.5	35.7	38.1	144.9
Space Science	<u>11.8</u>	<u>12.8</u>	<u>17.4</u>	<u>23.1</u>	<u>22.2</u>	<u>87.3</u>
<u>TOTAL</u>	96.7	122.7	131.2	151.2	194.1	695.9

Source: MOSST, Interim Space Plan 1985-1986.

* Estimate based on the Interim Space Plan.

A glance at other space-related activities finds the federal government in such areas as technology development, remote sensing, communications, and space science. The figure above shows federal government expenditures to the space program. It has been an active participant in the development, building and launching of Canada's first satellites. It has aided, through various incentives, the involvement of private industry in its space program. As part of the government's policy to transfer technology to a maturing Canadian industry, direct departmental involvement is lessening and concentrated mainly in broad program areas. Some of these include: maintaining and operating the David Florida Laboratory for the integration and testing of satellites and space components, and expansion to provide environmental testing and integration services for complete spacecraft; conducting studies in satellite applications development, EHF and frequency utilization, DBS system establishment,

preliminary definition of a remote sensing satellite; the development and demonstration of new applications of communications satellite technology, for example, the development of the Mobile Satellite (MSAT) program, the development and experimental use of satellite-aided search and rescue systems (SARSAT); as well, research and development in a number of key areas of technology.

7.6.3 Emerging Environment

The emerging environment of the space systems operators and service providers market hinges on possible changes in government policy and the introduction of new satellite technology.

A discussion of the threat posed by carriers, broadcasters and others as new entrants in this area is found in point 7.2.3. What changes to Telesat's mandate and operations will result from the two-year review and how these will impact on the industry awaits. Similarly, the anticipated changes to occur with the possible sale of Teleglobe and the effect this will have on the industry is held in close view. Teleglobe is already concerned with the possible establishment of competing international satellite facilities.⁷

As well, the future of the systems operators and services provider industry will be influenced significantly by the development and implementation of new technologies, of which, direct broadcasting by satellite (DBS), mobile satellite (MSAT) systems, and remote-sensing (RADARSAT) systems are elaborated.

The DBS study program, which ended in March 1983, "covered system requirements as well as socio-economic, institutional, policy, regulatory and technical issues."⁸ The resulting DOC information report "Direct-to-Home Satellite Broadcasting for Canada," provided information on the economic viability of a DBS service, the impact of such a service on the broadcasting, manufacturing and program production industries here in Canada, and potential impact of those DBS services that will spill over into Canada from the U.S.⁹

The MSAT program is intended to meet a demonstrated need for improved public and government voice and data mobile communications for business applications in under-served and unserved areas of the country. It is an industry-led joint venture with Telesat Canada, a U.S. satellite operator, DOC and NASA. Telesat is playing a lead role and will involve a large number of Canadian companies in MSAT services retailing and in satellites and ground terminals manufacturing.¹⁰ The MSAT program supports industry in its plans to establish a commercial MSAT communications system with a variety of related mobile radio, mobile telephone, and data

services by 1988. In the course of development of private-sector space systems technology, including engineering skills and expertise in the labor force.¹¹

The RADARSAT program is sponsored by EMR through its agency, the CCRS (Canada Centre for Remote Sensing). DOC lends ongoing support to develop a proposal for implementing the RADARSAT system. The system will consist of a remote sensing satellite and related ground receiving and data processing facilities which should produce maplike images of the earth. Additionally, the system should provide information essential for safe and efficient navigation, and a world set of stereo radar images for geological assessment of mineral resource potential.¹²

RADARSAT should also increase Canadian penetration of the international market for space and ground systems, as well as the applications expertise to export information services.¹³

SPACE EQUIPMENT MANUFACTURERS

7.6.4

Structure

The space equipment industry is defined to consist of firms with sales of goods and services in both space and ground segment activities. Of the forty firms which comprise this industry (refer to Tables 69-80), the majority (85 percent) divide their manufacturing and service activities on an average 40/60 percent basis between space-related activities and other communications-related activities, respectively. The other six firms (in this particular instance, all the top earners) divide their space-related activities and other communications-related activities on an average of 80/20 percent basis. The company ranges are from a low of 2 to a high of 100 percent active in space-related activities.

The space industry is 90 percent Canadian-owned and industry sales contain an estimated 75 percent Canadian value-added content--well above the 37 percent for Canadian manufacturers as a whole. Overall, the industry has been growing at over 50 percent per year in recent years and has earned revenues of about \$300 million in 1983. Most firms are located in the province of Ontario with a smattering of firms located in the province of Quebec, Manitoba, Saskatchewan and British Columbia. They currently employ 3,000 highly-skilled technical and professional people. Export sales vary from year to year and account for between 50 and 70 percent of sales.¹⁴

Space industry firms run the gamut from the design, development, manufacturing, assembly, testing, analysis, and

marketing of satellite subsystems and components, terrestrial systems and equipment for space applications to more dedicated sector-specific products and services. Here again, the industry is segmented by product with the larger firms offering a wide range of products compared to medium and smaller firms specializing in certain areas.

To a great extent, the structure of the space equipment manufacturing industry subsector is characterized by the government's participation in the industry. Both Telesat and Teleglobe Canada are major consumers of equipment in this sector. Combined 1983 and 1984 expenditures of equipment in the space segment for both firms exceeded \$21.8 million.* Total Government Space Program expenditures in 1983-1984 of \$131.2 million will act as an incentive for firms to become involved in the industry. A further incentive is long-standing objectives of this department to assist key companies demonstrating a need or expertise in areas promising growth and exploration. Such identified players benefit from contracting, financial and technical assistance programs, marketing support, etc.

7.6.5

Conduct

In terms of expenditures dedicated to the space program, Canada has become one of the largest users of space systems and has developed a world-class, export-oriented space industry.¹⁵ While the technology itself largely determines the behavior and direction in which the industry is taking, government policy and, indirectly, government regulation point toward pursuing international opportunities, maintaining and developing Canada's capabilities, encouraging private-sector investment in R & D, facilities, and the commercialization of space.

Space technology is evolving rapidly and this is particularly true of receive-only earth stations. The potential exists for widespread application of this technology to business telecommunications and networking.¹⁶ Canada currently maintains a narrow lead in the development and innovative application of this technology. Accompanying the growth of the space industry technology is the extensive and increasing demands for financial and human resources. Unfortunately, Canada has neither of these in the scale necessary to be a leader in all areas. Therefore, it must rely on a strategy of concentrating resources on a few areas where the probability of achieving benefits is highest.¹⁷ The

* Teleglobe: for a 12-month period ending March, 1984 and a 9-month period ending December 1984, total payments to six suppliers were \$8,690,987 and \$2,738,801.
Telesat: 1983 procurements were \$5.6 million, 1984 purchases totalled \$4.8 million.

success achieved in developing and manufacturing communications satellites for the domestic and international markets is an example of this strategy. The equally successful strategy of entering into cooperative joint ventures with other nations, particularly the United States and the European Space Agency, has permitted Canada to broaden the scope of its space program, both technically and financially. This strategy forges important and lasting government-to-government links, encourages international industrial cooperation and partnerships between manufacturing industries supported by individual governments, and helps to provide Canadian access to major new technological developments abroad.¹⁸

The space manufacturing subsector is not subject to government regulation. However, the industry is directly affected by the government's involvement in concept and feasibility studies for space activities and indirectly affected by government policy and regulation in areas such as satellite capacity and earth station ownership. Such policies and regulation, in turn, affect the marketing of equipment. If policy and regulation lag behind or get out of step with the evolution of space technology, a disincentive to manufacturing is created.

Research and development is crucial to the success of Canada's space industry. Basic and applied research in space science and technology is conducted by Canadian universities, manufacturers and government scientists. Product development is undertaken primarily by manufacturers, frequently with incentives from the federal government. Canadian universities tend to emphasize basic research rather than the development of product application.

7.6.6 Emerging Environment

The emerging environment for the space manufacturing industry is to a large extent dependent on the federal government's Interim Space Plan for 1985-1986 and the future longer term Strategic Space Plan due to be announced by the end of 1985.

One of the prime initiatives in the Space Plan will be the federal government's acceptance of the invitation to participate in the U.S. Space Station Program. Project design and preliminary definition studies on several identified Canadian options will be carried out under the \$8.8 million allocated to the project in 1985-86. Participation in further phases of the project is dependent upon the benefits to the Canadian space industry and will be substantial if Canada remains committed to the project.

7.6.7 International Environment

Canadians competitiveness in the development and use of space technology has been clearly illustrated in international markets. In part, there is considerable overlapping between the international environment and other elements of the space manufacturing industry. For example, some of the current projects in the Canadian Space Program, discussed earlier in this section, have international implications. MSAT is a joint Canada-United States project and RADARSAT has links to the U.S. Space Station Program. In fact, as stated in the announcement of the Interim Space Plan²⁰ "most of Canada's space projects have been undertaken as cooperative joint ventures with other nations, particularly the United States and the European Space Agency (ESA)". The marketing efforts of equipment suppliers has been therefore concentrated on foreign markets.

Canadian government scientists are carrying out research in such areas as space plasma physics and upper atmosphere physics and chemistry. Such research provides Canada with the opportunity to participate in international space science programs as well as providing Canadian manufacturers with the technology to develop and manufacture state-of-the-art space instrumentation.²¹

Spar Aerospace is one Canadian company which has been particularly successful in the international market. Spar has taken a major part in space projects such as SARSAT (Search and Rescue Satellite-Aided Tracking), a cooperative Canada, U.S., France, U.S.S.R., project implemented in 1983. Spar, in cooperation with SED Systems of Saskatoon, is the prime contractor for Brasilsat, a Brazilian communications satellite project for which the first of two satellites should be launched in early 1985. Spar is also involved in ERS-1, the ESA remote sensing satellite project and in an expansion and update of the domestic satellite system in China. Through its U.S. subsidiary, Spar is active in the full range of TDMA (Time Division Multiple Access) equipment for satellite communications.²²

FOOTNOTES

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2. Teleglobe Canada, Annual Report, 1983-1984. p. 40.
3. Department of Communications, Study of the Canadian Market for Satellite Communications Products and Services, Summary Report. January 1984, p. 9.
4. DOC, Summary Report, p. 9.
5. Ibid., p. 7.
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7. Government of Canada, Department of Communications, Annual Report 1983/84. p. 24.
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17. MOSST, Interim Space Plan, p. 3.
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21. Ibid., p. 7.
22. Spar Aerospace Limited, Annual Report 1984.

8.0 REGIONAL ASSESSMENT

8.1 Introduction

The general intent of this section is to provide the regions collaborating on the assessment the opportunity to submit an analysis of the communications sector which more accurately reflects their own regional objectives, priorities, and opportunities.

With very minor editorial changes the following selections are extracts from the contributions by regions made in response to this call.

8.2 **Pacific Region**

Introduction

The Province of British Columbia is not always in accord with the federal government on matters of regulation especially in the area of reception of unauthorized satellite signals. There will be great interest in the outcome of the CRTC's interconnection decision and there are players on both sides in the market who feel strongly about the issue. Regarding constraints, perhaps the most repeated concern is B.C.'s remoteness from the resources available to Central Canada. B.C. has an industry that is a "critical mass" which has the ability to grow because B.C. has much to offer in terms of environment, quality of life, climate, scenery, etc. However, local firms face difficulties in accessing the power structure in Ottawa and do not have a profile relative to their size.

8.2.1 Telecommunications

With the advent of the CNCP/CN Rail venture to install a fibre optics system linking Vancouver with Edmonton, announced in April of this year, the Province's major telecommunications company, B.C. Tel, has become quite nervous about its impending loss of dominance in the provincial market.

B.C. Tel's Chairman, Gordon MacFarlane, makes mention of this in the company's 1984 annual report. He states, "Of great concern is the possibility that a major constituent of our total revenues, that derived from our long distance services, will become vulnerable through competition which we regard as unjustified and, in some respects, unfair."

Most significant to telecommunications manufacturers and suppliers is the movement towards integration of office and communications technology. Worldwide markets are already a fact; but there will be even more emphasis on what B.C. can contribute best: knowledge and expertise.

8.2.2 Broadcasting and Cable

Mr. Jamie Brown, President of the B.C. Association of Broadcasters, voices concern for the continuing survival of the small broadcasters. The economy of B.C. has been depressed, and the number of bankruptcies and business failures has lessened the market base upon which broadcasters can draw to meet their expenses. Increasing costs, such as the recently announced license fee increase, make it difficult for small broadcasters to continue in the business. There may develop a trend for small broadcasters to be bought out by large broadcasters who can realize economies of scale. This would result in a lessening of broadcast diversity at a time when the CRTC is attempting to encourage it.

The regulations governing FM broadcasting are affecting the viability of broadcasters. Mr. Brown feels that national policies do not work, and the regulations should be amended to allow for regional anomalies. It is his opinion that the FM programming regulations are a theoretical approach which are not reaching their objectives in practices. They are leading to "ghetto-zoned programs," i.e., those required programs with little audience appeal are being programmed into the least offensive time periods. Because of the availability of satellites, there should be less emphasis on protectionism.

Some of the issues facing the cable operators in British Columbia are as follows:

- 1) Resolving the problems caused by competition of SMATV operators. Part of the resolution of this issue may be the necessity for cable operators to increase their service offerings;
- 2) Resolving the matter of redefining a broadcast undertaking; passage of Bill C-20 should alleviate this problem;
- 3) Resolve the BCUC/CRTC licensing authorities as they impact on legislative compliance by the public. It is the view of the cable operators that there should be only one licensing authority;

- 4) The cable television industry in B.C. is now a mature industry. Up until the last five years there were two opportunities for growth: infilling within the licensed market, and extending markets. The growth rate is now between 1 - 4% (as compared to a rate of 7 - 11% during the years of rapid growth). This means that cable companies will have to seek rate increases or increase/expand services available to subscribers in order to sustain their return on investment, rather than relying on sustaining revenues by enlarging the subscriber base, as was possible in the past;
- 5) The inability or unwillingness of the regulator to react to unlicensed operators will impact on future operations. The current administration of the regulations has caused an "unlevel playing field," in that the licensed operators are finding it difficult to compete with the unlicensed ones. The cable industry is of the opinion that the regulations should be the same for both licensed and unlicensed operators.

In conversation with various representatives of the B.C. broadcasting and cable industries, the following have been identified as issues which would have to be addressed if future operations are to be successful:

- 1) The current regulations of the Department of Communications do not allow the authorization of additional FM frequencies to a service contour area. The current regulations governing the allocation of FM frequencies were developed in an era when extreme caution had to be exercised to minimize the risk of interference. Today, however, the technology has allowed for greater precision in the allocation of FM frequencies. It has been suggested that the DOC should, therefore, investigate the possibility of making the regulations more lenient and allow for the allocation of additional FM frequencies to licensees to allow them to overcome shadow areas within their licensed market areas. Problems of shadow area are of particular concern in B.C. because of the many mountains and valleys. The Department should investigate the possibility of having different regulations for FM broadcasters in B.C. due to the unique problems caused by the topography;
- 2) Broadcasters are going to be increasingly impacted by narrow-casting and regulations should be developed to reflect the reality that this will cause. One opportunity which narrow-casting will present is the ability of licensees to increase the number of service offerings within their authorized frequency allocation. As narrow-casting becomes increasingly available, there will develop audience program

loyalty and broadcasters must not be constrained by regulations to adapt to a changing environment.

- 3) Allowance should be made for the use of frequencies for networking services. Regulations should allow networking to be attained without time-consuming and costly administrative processes, this would make it easier for small broadcasters to develop a quality product;
- 4) The regulatory process should be simplified. The cable industry would like minimum regulatory constraints on their operations allowing flexibility in reacting to competition from unlicensed operators;
- 5) Resolving the matter of copyright. The cable operators are of the view that copyright may cause increased costs which would have to be recovered from subscribers. This would make the cable companies even less competitive with the unlicensed operators. Also, there is a possibility that the requirement to pay copyright fees may force cable operators to eliminate some of their service offerings;
- 6) In order to be successful in the future, cable companies will be undertaking capital investments to replace equipment and upgrade existing plants to improve quality and increase channel capacity. Also, cable companies will be extending service to areas not currently served. It is estimated that approximately 15% of the province is not cabled.
- 7) In the future, the market for cable television services will be much more price sensitive. The cable industry in B.C. will have to closely monitor the market profile so as to be sensitive to significant movements towards the use of satellite dishes and roof-top antennas.

8.2.3 Cultural Industries

The cultural industries in B.C. are generally small, highly competitive businesses with a diversified scene. All face competition for the leisure dollar. The motion picture industry and the sound recording industry have developed international profiles. The creative vitality is in evidence in all sectors but the consistently excellent showing of B.C. musicians at the Juno Awards should be noted.

The need to upgrade to new technologies is recognized and occurring. For example, Little Mountain Sound Studios has garnered increased business by upgrading to solid state logic console, the only one of its kind in Western Canada.

The lack of access to financial resources for capital investments is a hinderance to the development of the cultural

industries in B.C., just as it is with informatics industries. Since most are small independents, there is difficulty in competing for distributions and exposure with the multinationals.

The motion picture industry in B.C. has begun to look to the financial market. Tegra Industries Ltd. is now listed on the Vancouver Stock Exchange as a public service and facilities company. Creative personnel are beginning to integrate film and video techniques to compete for the increasing demands of the marketplace.

The balance of future prospects requires more time than this quick look allows. There are obvious opportunities that will flow from Expo 86 and most of the associations are preparing marketing strategies.

8.2.4 Informatics

A profile of the B.C. computer software industry is provided by Touche/Ross and Partners in a 1984 study: small company size with a heavy reliance on local markets, complicated by inadequate resources and marketing capabilities to compete strongly in larger markets.

The Touche/Ross survey also shows that for the larger B.C. companies, growth has been "moderately healthy" while for the smaller ones, of which there is a majority, there has been low growth. The major factor contributing to B.C.'s poor showing in the computer software industry is geography. B.C. is too far from the major markets and too far from the major areas of technical development. The fact that there is not as much government business as in other areas is also indicative of a poor software economy.

B.C. software companies, therefore, find themselves in a Catch-22 position. In the words of the study, they "...are too small to be able to fund the kind of development and marketing required to take advantage of major opportunities in the marketplace (so) they are also likely to have considerable difficulty in obtaining adequate funds for this purpose from lending agencies."

According to Touche/Ross, another indicator of a poor rating for B.C. is the fact that the industry is overpopulated. This argument is contrary to prevailing attitudes in the industry today, however. Touche/Ross predicts that if current trends continue, i.e., software buying decisions becoming less dependent on proximity to the software developer, B.C. is in trouble. The B.C. market will become more susceptible to external competition and, therefore, will be unable to compete due to a lack of marketing and technical development capabilities.

There will be many opportunities in the national and international markets for software growth and development, but at present, B.C. lacks the necessary marketing expertise and financial resources to expect more than an insignificant role, even though the skills are available in abundance. In the Touche/Ross study of the B.C. software industry, it is indicated that there are two possible directions to go: "...the first is to encourage those companies which are already large and or (encourage those companies that) have a demonstrated capability to become large. The second is to find ways of making small companies (of which there are (sic) a preponderance) viable." The most critical changes needed are: "...upgrading of marketing resources and expertise, increased investors confidence, software suppliers' ability to obtain financing, and improved competencies related to business planning and management."

8.3 Central Region

8.3.3 Cultural Industries

In 1983, Manitoba Culture, Heritage and Recreation undertook an initiative to study in detail and the book and periodical publishing industries in Manitoba. The result of this study was a report entitled: "Avoiding the False Dialectic - Culture vs. Commerce: A Report on Manitoba Publishers of Culturally Significant Books and Periodicals and Recommendations for Government Action." To date the report represents the most detailed analysis of the publishing industries in Manitoba.

The profile of the Manitoba book and periodical publishing industries revealed an industry sector which is relatively young: nearly half of the book publishers and all of the periodical publishers have been in operation less than five years.

At the time of the study, the consultant also found that both book and periodical publishing in Manitoba were heavily dependent on internal/external subsidies such as direct self-generated internal subsidies, specific grants geared to book publishing and specific employment grants geared to non-cultural industry publishing. Periodicals in Manitoba are largely of the literary, arts criticism, and social criticism genre. It was noted that both book and periodical publishers have not penetrated the public sector markets to a great degree.

Production capacity was found to be efficient given the existing facilities, but it was noted that the publishing industry in Manitoba is lacking access to the new electronic technologies which will enable it to compete and improve internal

efficiency. Undercapitalization and a lack of access to loans has presented the greatest obstacle to utilizing the new technologies.

Saskatchewan has a relatively small but active book and periodical publishing industry. It should be noted, however, that the publishing industry, in general, in Saskatchewan is heavily dependent upon the unpaid labor of many individuals working in the industry.

The three greatest problems facing Saskatchewan publishers are:

1. market access problems which are created by Saskatchewan's geographical placement;
2. lack of access to local tertiary publishing services such as jobbers, typesetting facilities and binding facilities;
3. overall financial concerns of access to capital, operating revenues, etc.

The major source for information regarding film and video production in Manitoba is a report released in March, 1984, which was produced by Paul Audley and Associates, entitled: "A Report on Film and Video Production, Distribution and Exhibition in Manitoba and Recommendations for a Manitoba Government Policy." The report represents the most detailed and recent study of the film and video production industries in Manitoba.

Film and video production is carried out by both public and private sector producers, with both public and private financing. A significant amount of co-production activity and a substantial volume of contract or commissioned productions, including television commercials, industrial and government films, are produced in Manitoba.

A large majority of CBC production is found to focus on news, information, current affairs and sports. CBC spent \$1,500 for local non-CBC produced films in 1982-1983. The four commercial television stations in Manitoba were also found to focus mostly on the production of news and current affairs programming.

The independent film production industry in Manitoba is a relatively new industry with most of the companies beginning their operations in the late 1970's. They have demonstrated an upward trend in revenue earnings. They were also found to be primarily involved in the production of films that are not intended for either the television or the theatrical market. Rather they are producing educational and industrial films for sale to business, government, libraries and educational

institutions. They are secondarily involved in the production of television commercials.

The mainstay of the independent film production industry is contract production from public and private sources. Distribution is carried out through government film libraries, the National Film Board and industry associations such as The Winnipeg Film Group and Video Pool. For non-contract basis films, most companies handle their own distribution in Canada, using other firms as agents in the U.S. Distribution remains a problem in Manitoba as only two small distribution companies are operative.

The cable television companies involvement in production comes about through its responsibility for the community programming channel. Some provincial government departments such as Tourism, Education, Agriculture, etc; are involved heavily in their own in-house production of films and videos. They distribute their products through film libraries, including the Public Library.

Since opening its Winnipeg office in 1975-1976, the National Film Board has been an important producer of films which reflect the cultural life of Manitoba and the creativity of the Province's filmmakers. The NFB distributes approximately 2,000 film titles in its catalogue through sales to the Department of Education, the Public Library Services Branch, individual libraries, the NFB's own lending service, the NFB, theatre, sales to broadcasters, free distribution on cable and sales to schools and school divisions throughout the province.

Information on the Manitoba recording industry is found in a preliminary study undertaken by Manitoba Culture, Heritage Recreation, entitled: "Preliminary Data On the Recording Industry in Manitoba," released in April, 1984.

A Manitoba profile indicates that the recording industry in Manitoba is a relatively new phenomenon. It is a small industry comprising companies and individuals involved in the various processes of recording which includes the creation, production, marketing and distribution of local recordings. The majority of recordings and releases, with the exception of those of the ethnic music category, are self-financed and self-arranged from recording to distribution. Thus, artists have often formed their own labels. The total number of albums produced by record companies in Manitoba has dropped over the last three years from seventeen in 1981 to twelve in 1982, and to seven in 1983. The greatest difficulty for the record companies is a lack of working capital and a decline in the market for ethnic records.

Three independent artist labels operate in Manitoba and are involved in all aspects of recording, including the production, promotion, marketing, and distribution of their product. These productions are often fully financed by the artists.

Most production occurs in Manitoba. The primary markets for Manitoba's independent artist labels is Manitoba and Canada. 1983 figures indicate that none of the labels were able to avoid a loss. The Manitoba situation resembles the state of the Canadian market in general which has been noted to be experiencing difficult financial times.

Distribution has been mentioned as one of the major constraints facing recording artists in Manitoba. By far the greatest percentage (over 70%) of revenues earned were from foreign content records on foreign labels, although the subsidiary company in Manitoba indicated that Canadian content records have improved over 5% in the last couple of years. Little identifiable funds, however, are allocated to the promotion of these Canadian content records.

The CBC regional office broadcasts six hours a day of local programming of which four is music programming. CBC has a policy to promote and support local talent and to this end has established a committee of four producers to decide what new local music is needed for the up-coming season. Their annual budget for local recording was \$38,000 in 1983 which includes musicians fees and recording costs. Artists may sign a lease agreement with CBC which enables them to use the master recording for their own pressing.

NOTE: A further submission discussing telecommunications, broadcasting and cable, informatics and space sectors did not arrive in time for inclusion in this report.

8.4 **Ontario Region**

Introduction

The Telecommunications and Informatics subsectors are concentrated in Ontario. In the area of Broadcasting and Cable, the majority of broadcast and equipment manufacturers are located in Ontario. Cultural Industries--Film and Video, Sound Recording and Publishing are concentrated in Ontario. Over 50 percent of the Canadian arts labor force and artists are located in Ontario.

8.4.1 Telecommunications

In Ontario, the Telecommunications sub-sector is characterized by high growth and continues to provide a substantial

contribution to the overall domestic manufacturing output growth. Communications equipment manufacturers contribute toward the total high-tech manufacturing output for Ontario.

The sub-sector has had an average annual export growth rate of over 30 percent since 1977 and continues to show significant trade surpluses in certain areas. However, the shipment of commercial telecommunications equipment for Ontario manufacturers dropped by 7 percent in 1982 from 1981, and 15.8 percent in 1983 from 1982, due in part to the recession, slow growth, a tendency toward off-shore manufacturing and to foreign competition. In general, however, environmental and industry dynamics appear to favor large, well-capitalized, vertically integrated, companies rather than small to mid-sized firms. Technological convergence has provided the sector with new opportunities to address the expanding market for improved information management. Recent estimates by Bell Canada indicate that market demand for communications networks is growing at 30-35 percent per year. New opportunities however, are countered by increased competition by multinationals, i.e., AT&T and IBM.

In terms of Telecommunications services, the two dominant carriers in Ontario are Bell Canada and CNCP. The carriage sector is in a period of transition and is facing pressures domestically as well as internationally. There is increasing global and domestic competition with a trend in North America towards deregulation in an attempt to improve industry competitiveness.

There has been on-going consideration opening up trade with the U.S., especially in the area of advanced technology. Industry representatives anticipate that the expanded market provided by free trade arrangements would be beneficial in that Canadian companies could corner some of the American markets. Reservations vis-à-vis free trade have been expressed by industry observers who feel that free trade arrangements would, contrary to the latter, afford American firms the opportunity to corner more of the Canadian markets.

There is also the risk that the Americans could eventually abrogate free trade making Canadian manufacturers vulnerable given the necessity for retooling or rebuilding plants in order to mass-produce for the American market.

8.4.2 Broadcasting and Cable

In terms of hardware, the majority of broadcast and CATV equipment manufacturers are located in Ontario. Consumer electronics manufacturing in Ontario is dominated by foreign multinationals; the majority of products are imported from Japan, with the remainder supplied by approximately 80 distributors, most of which are located in Toronto or Montreal.

Technical developments have had a far-reaching effect on the broadcasting industry and continue to present new opportunities. The use of SCMO will provide FM broadcasters with new services to offer and new revenue bases. Developments in television have presented the opportunity to add: stereo sound, separate audio programs which can be utilized for second-language or other narrow casting purposes, teletext, enhanced definition and high definition TV via fibre optics or DBS to improve picture quality.

Cable television operations have become the focal point of the broadcasting system. The expansion of programming choice via the tiering of cable services and the extension of cable priority carriage rules to encompass satellite-delivered services is intended to expand the broadcasting system's audience and revenue base, provide an on-going vehicle for Canadian programming, and permit the sector to be more in tune with the competitive technological environment.

Satellite delivery of distant broadcast signals to cable systems has become a contentious issue. Broadcasters in Ontario view this development as seriously undermining the local broadcaster and access to advertiser revenues, as well as contributing to increased centralization and duplication of programming available through "free" conventional broadcasting.

Despite the introduction of CATV, Pay-TV and the popularity of VCR's, established broadcasters have maintained a fairly healthy hold on the market; audience fragmentation leading to extinction has not materialized as had been envisioned. Pay-TV has succumbed to the realities of the domestic market, which is too small to sustain companies competing for relatively few subscribers and high cost structures, leading to the present merger situation. The CCTA points out, however, that failure is normal in a young industry, noting that Home Box Office, which currently has a 50 percent market share in the U.S. incurred losses for 5 years after its 1972 launch. Pay-TV companies have expressed the view that specialty services may undermine the pay market by wooing customers away from an already unstable customer base.

Criticism has been levelled at FM regulatory policy on the grounds that the prescribed quota of spoken content, Canadian content, and limitations on the number of top 40 tunes played erodes listenership from Windsor radio stations which are by passed in favor of Detroit FM stations; the erosion of listenership translates into a decline in advertising dollars and thus, commercial viability. Intervenors, such as the provincial government, have suggested that the Windsor scenario is significant because it may repeat itself throughout Ontario given the ever-increasing presence of American signals, coupled with changing technologies and a changing consumer environment. Given

Windsor's competitive environment, the CRTC has moved to consider Windsor radio stations with greater leniency than other areas in Canada.

8.4.4 Cultural Industries

English-language film and video, sound recording and publishing are concentrated in Ontario. Ninety-eight percent of English-language publishing occurs in Ontario and is on the whole profitable. The foreign presence in publishing, however, is pervasive and foreign-controlled publishers continue to control the most lucrative sector, i.e., imported books. Sound recording in Canada is centered in Ontario.

In 1983, 122 film production companies were based in Ontario, with 112 located in Toronto. Ontario based production companies accounted for 55.1 percent of total domestic expenditures.

Distribution in Canada is subject to a high degree of foreign control--7 major distribution companies are U.S.-owned (out of 8 companies earning revenues over \$5 million) and accounted for 84 percent or \$15.8 million in total revenues. Only 2 percent of exhibition time is devoted to Canadian films, with the remainder largely devoted to American films.

Problems faced by cultural industries in Ontario (and Canada) are:

- 1) the small size of the domestic market. Cultural industries cannot depend on the home market as a major market;
- 2) the low cost of imported products vs. the higher cost of original Canadian productions;
- 3) concentration of activities in the hands of a few very large companies which are vertically integrated (although vertical integration in some cases is beneficial);
- 4) domination by foreign-owned companies;
- 5) balancing the often conflicting demands of shaping a "Canadian identity", maintaining artistic integrity while being driven by economic imperatives.

While Canadian artists have received tangible benefits from Canadian content regulations designed to encourage the growth of indigenous cultural industries, encouraging a more

positive attitude toward Canadian productions by broadcasters and the Canadian people may prove more difficult.

Technological advances have been made in production techniques in publishing, sound recording, film and video. In publishing, there is a fear that increased efficiency will eliminate existing high-skilled jobs and require high capital investments. Concerns have also been expressed about the possibility of new mediums making in-roads on print, although this phenomenon has not yet occurred. Sound recording techniques are undergoing transformation via conversion from analog to digitally-based recording and play-back technology; high capital investments will be required for the purchase of new studio equipment. In the area of video production, MuchMusic, a specialty service distributed via cable, promises new opportunities for the video and music industries. Under a CRTC directive, 2.4 percent of Much Music's gross profit is to be contributed to Canadian video production utilizing Canadian talent.

Threats to the film and video industry's share of the leisure dollar via pay-TV and video games have not materialized to the degree anticipated. VCR's have made significant inroads into the theatre market but have at the same time expanded the film market via wider distribution by video cassettes and have permitted the film industry to enter the retail and rental business.

8.4.5 Informatics

The Informatics subsector has been a high-growth sector in Canada over the past ten years. The Ontario computer industry performance was viewed as favorable with profits having risen despite purchasing cutbacks by large computer buyers during the recession.

Foreign penetration of the Ontario information processing industry remains extremely high, accounting for the majority of information processing revenues. Ontario accounted for 56 percent of the total operating revenues generated in the area of computer services and employed 57 percent of the national total.

The recent trend in office automation has been to move from purely telephone switching equipment to products that combine data with voice switching. International Data Corporation Ltd., a Toronto-based research firm, predicts that in the next five years, shipments of multi-functional work stations integrating voice and data capabilities will grow at an annual rate of more than 65 percent. The concentration of telecommunications and computer expertise in Ontario will offer a conducive market environment.

There is a trend towards viewing free sectoral trade with the U.S. as a means to increase competitiveness via greater access to the larger American market. However, some industry observers feel that free sectoral trade means that Canadian subsidiaries can have data processing needs fulfilled at the American head office. Negative repercussions also include lost R&D and managerial jobs, as well as damage to Canadian sovereignty. There is also the risk that Americans could eventually abrogate free trade due to increasing protectionist sentiment in the U.S. which is rooted in the expanding U.S. trade deficit. Unless there is assurance vis-à-vis guaranteed access to U.S. markets, Ontario industries will be incurring risks in that substantial investments are required to operate on a North American level.

Industry representatives have commented that the definition of R&D for tax purposes is too narrow by definition for software producers to benefit. The current definition is subject to interpretation by Revenue Canada and industry representatives perceive them as not having the "expertise" to determine whether software development is eligible.

8.5 Quebec Region

8.6 Atlantic Region

NOTE: The contributions from both the Quebec and Atlantic Regions did not arrive in time to be included.

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