

TOWARD A POLICY FRAMEWORK
FOR THE ECONOMIC DEVELOPMENT
OF THE COMMUNICATIONS/INFORMATION SECTOR

by

Price Waterhouse Associates
Management Consultants

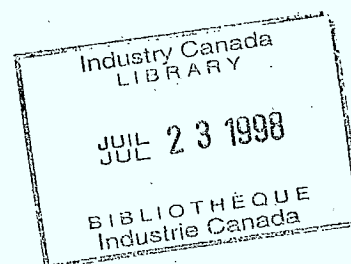
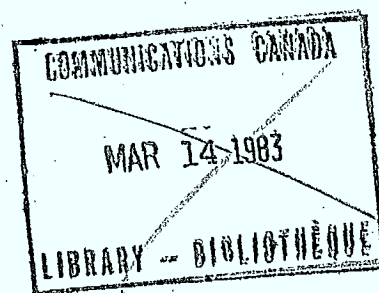
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DEPARTMENT OF COMMUNICATIONS
GOVERNMENT OF CANADA

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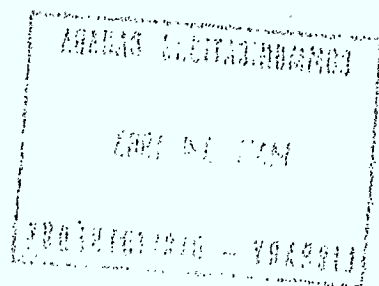
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Montréal, P.Q.

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November 30, 1981

TOWARD A POLICY FRAMEWORK FOR THE
ECONOMIC DEVELOPMENT OF THE
COMMUNICATIONS/INFORMATION SECTOR

A report prepared for the
Department of Communications

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FOREWORD

The Communications/Information Sector is a major component of the Canadian economic infrastructure and represents a vital link for all economic activities in this country. It is a rapidly growing sector and as such it represents a major source of economic growth.

The strategic importance of the Communications/Information sector makes it imperative that its definition be more clearly established and its relationship with the rest of the economy well understood.

The "Policy Framework" study is a first attempt to assess the key characteristics of the sector and the main trends which will affect its development in the 1980's. It also provides a preliminary analysis on the key economic development policy issues which policy makers will likely face in the coming years.

Within its defined scope, the study does not deal with all of the components of the sector to the same degree. In particular, the nature and characteristics of the space sub-sector were deliberately omitted and will need to be incorporated into the framework at a later date. In addition, some of the pertinent issues may warrant analysis in greater depth. For example, the external trade imbalance is of such significance that a detailed analysis of the trends, underlying causes and policy options is required. Also, federal and provincial policies applying directly or indirectly to the sector should be reviewed and evaluated at greater length.

EXECUTIVE SUMMARY

Economic development policy must come to grips with a sector which is:

- . responsible for a trade deficit of \$2.7 billion dollars;
- . at the heart of an increasingly information-intensive economy;
- . deeply affected by technological change; and
- . the subject of a myriad of government programs costing an estimated \$1.8 billion at the federal level alone in 1981/82, but most of which have non-economic objectives.

This is the communications/information sector, a group of industries including telecommunications, postal service, broadcasting, program production, publishing, computer service bureaus and software houses, and manufacturers of EDP and telecommunications equipment. These industries are extremely varied, but they are linked together by the fact that they all sell products or services related to information, and by:

- . their increasing reliance on electronic technology;
- . purchases of equipment;
- . the role of carriers and broadcasters in delivering content;
- . the use of various media to market or provide consumers with information on other media, as well as on equipment and carriage services; and
- . the re-use of content produced for one medium in others.

The report provides an overview of the economic characteristics of these industries, their industrial organization, existing government programs, economic performance, major trends affecting their future and key policy issues. These subjects are discussed first under the heading of four sub-sectors - carriage, content, equipment and computer services - then drawn together for the sector as a whole.

Industries and products within the sector vary widely in terms of the stage they have reached in the life cycle, whether they sell largely to businesses or to consumers, the degree of market power and so forth. However, one common characteristic is substantial fixed costs, whether for construction of telephone networks, R & D on equipment, cutting the master copy of a record or development of computer software packages. Where market risk is also high, this can lead to significant financing problems.

The economic performance of the sector gives serious cause for concern. Canada's trade deficit in the sector amounted to \$2.7 billion in 1980. The deficit was heaviest in equipment, particularly office equipment (such as computers) and electronic components, but publishing and program production also show significant gaps. Export success stories such as telephone switchgear, Harlequin romances, service bureaus and production of television advertisements offer encouragement for the future, but at present they are dwarfed by the product lines where we import heavily and export little. Moreover, the transborder satellite issue raises the possibility of a trade deficit in carriage services, which to date have been essentially a domestic activity.

Continued rapid growth in the real output of the sector as a whole appears likely due to factors such as:

- the increasing size, complexity and geographical scope of businesses and public institutions. This development has led to greater needs to process, compile and transmit information within organizations, to communicate with the outside world and to keep posted on external events;
- the growing importance of governments and financial institutions, whose operations involve a great deal of information processing;
- growing leisure time and discretionary income, which have stimulated public demand for information products and services;
- rising educational levels; and

- . the declining real cost and increasing performance of electronic equipment, and thus of capital-intensive services such as telecommunications. This change opens up a steadily increasing range of applications for computers and related technologies.

This rapid growth could include sophisticated systems based on the combination of computer and telecommunications technology, such as the "office of the future" or home transaction systems such as tele-shopping or tele-banking, perhaps based on Telidon. On the other hand, prospects are less encouraging for some established parts of the sector such as the postal service, newspapers, cinemas and television stations.

The growth potential of the sector, its role in the economic infrastructure, the size of our trade deficit and the rapid evolution of technology raise many policy questions. Some of the broad issues are:

- . what aspects of carriage and related services should be open to competition, and how companies which provide both monopolistic and competitive services can be regulated effectively;
- . whether government should focus its support on specific companies or encourage mergers to create a limited number of Canadian companies better able to compete on a world scale in equipment, content production and software development;
- . whether government should focus support on Canadian-based companies, or on subsidiaries of multinationals which are assigned world mandates by their parent companies for specific products;
- . to what extent protection of the Canadian market is a feasible or desirable part of economic development strategy;
- . in what specific product lines or market segments Canada should specialize in order to compete effectively on a world scale; and
- . how equitable international competition can be ensured.

In resolving these and more specific questions, governments must take into account the high level of uncertainty in the sector, both in terms of the technical feasibility and market acceptance of innovations. Predictions are extremely difficult, and likely to reflect the biases and the natural optimism or pessimism of the forecaster as much as the realities of the sector.

Another critical concern for government must be to avoid fragmentation, overlap and inconsistency in its efforts. We have identified dozens of programs and a substantial number of departments and agencies concerned with the communications/information sector at the federal level alone. Developing a coherent economic development strategy will be further complicated by the fact that the primary objectives of many of these programs are cultural or social. Indeed, of the \$1.8 billion to be spent by the federal government on the sector in 1981/82, the majority is to cover the deficits of the CBC and Canada Post, and only a small proportion is seed money for high technology.

I - INTRODUCTION

This study was carried out under contract to the Communications Economics Branch of the Department of Communications. Its primary objective was to "provide a comprehensive assessment of the key characteristics of the communications/information sector and of the major trends which are likely to affect its growth and its contribution to economic development in the 1980's". The study was also intended to assist the department in identifying key economic development policy issues and the role which could be played by government.

The scope of the project was extremely broad. It would therefore have been impossible to gather new statistics or conduct extensive interviews with industry. However, studies have already been done and statistics exist on many of the individual industries within the sector. We made extensive use of these studies, which are listed in Appendix A, as well as dozens of periodical and newspaper articles on aspects of the sector. We conducted a limited number of interviews with people in industry and government who are knowledgeable about different parts of the sector, and who are listed in Appendix B. These were supplemented by discussions with specialists within our own firm, particularly in the areas of data processing and office automation. Throughout the study, we found that people were concerned by the magnitude of the task we had undertaken, but invariably helpful.

The subject is indeed vast. There are gaps and weaknesses in the basic data which were not for us to remedy. There is a great deal of room for legitimate controversy. However, we believe that this report provides a more coherent overview of the communications/information sector and its likely evolution than had previously been available. It also sets out many of the analytical approaches, and draws together some of the key facts and figures necessary for the formulation of a more concerted economic development strategy for the sector.

This project has been demanding, but very stimulating for us. We are pleased to have had the opportunity to undertake it, and to submit this report.

II - WHAT IS THE SECTOR?

Definition

The definition of the communications/information sector used in this study is deliberately narrow. Some other authors, to demonstrate the pervasiveness of information-related activities, have defined them to include such diverse occupations as civil engineers, insurance agents, judges, bookkeepers and production foremen. Under such a definition, 40% or more of total employment in Canada falls within the information sector. We do not wish to minimize the usefulness of such statistics in underlining the importance of information to the economy as a whole. However, our study concentrates on what may be considered the heartland of the sector - organizations whose revenues come from the business of information.

Outside the sector, there are many companies where information is a key factor in internal operations. Financial institutions such as banks, insurance companies and brokerage houses are particularly information-intensive. But, in the final analysis, they earn their income from lending money, providing insurance coverage or trading in securities, not from processing, supplying or transmitting information.

The economic activities included in the sector are those which derive their revenue from:

- transmitting information, including entertainment;
- processing information;
- preparing information, including entertainment, in a format suitable for transmission;
- producing, selling or maintaining equipment, software or other means for:
 - transmitting information;
 - processing information;
 - preparing information in a format suitable for transmission; or
 - receiving information.

Activities included

While they did not all receive equal attention in our study because of time limitations and data availability, the sector therefore includes, in principle:

- telephone and other telecommunications companies;
- the Post Office;
- courier services;
- cable television systems;
- television and radio broadcasters;
- motion picture theatres and film distributors;
- retail outlets such as record stores, bookstores and newsstands, and associated wholesalers;
- libraries;
- producers of cinematic, television and radio programs;
- sound recording companies;
- publishers of books, magazines, newspapers and directories;
- news services;
- electronic information services, whether provided through Telidon or conventional computer technology;
- advertising agencies, including those involved with direct mail and outdoor advertising;
- firms providing reproduction or technical services related to content production such as:
 - motion picture laboratory and production services;
 - recording studios;
 - record and tape manufacturing;
 - printing;
 - platemaking, typesetting and trade bindery.
- computer service firms, including service bureaus, software houses and system houses;
- manufacturers of:
 - telephone and other communications equipment;
 - electronic data processing and other office automation equipment;
 - home entertainment equipment, including television and radio receivers;
 - equipment for other industries listed above; and
 - electronic and other components for such equipment.
- distributors and retailers of equipment.

Most of these activities are dominated by firms for which they are the primary source of revenue, and which therefore constitute the "industry" in statistical terms. Our focus is on these firms because statistics are more readily available and they account for the bulk of the output. However, a significant fraction of computer services is provided by firms such as IBM for which it is a secondary activity, and much of the retailing of mass market publications is carried out through supermarkets.

Our study was also limited deliberately to open market activities, rather than those performed in-house, because the considerations at work can be quite different. It therefore excludes the EDP departments within businesses and governments, as well as in-house libraries, printing departments (except in publishing firms) and messenger services. In-house EDP operations are, however, addressed indirectly because of their impact on equipment purchases, and because policies directed at open market computer services may also have a major economic impact on in-house activities.

Linkages

A list of activities or industries does not, in itself, constitute an economic sector. There must be interrelationships among the activities, and characteristics common to them, which make the sector a meaningful grouping for the purposes of analysis and policy making. The principal interrelationships which we have identified in the communications/ information sector are described briefly below. Chapter IX deals extensively with characteristics common to the sector as a whole, while chapters V to VIII deal with commonalities within various groups of industries.

1. Technology

First, the sector is increasingly dominated by the technology of electronics, and indeed microelectronics. Computers are the most obvious example, but the same basic technology is now present in telephone switching equipment, communications satellites, television sets, text editing equipment and so forth.

The technology of communications/information equipment affects not only the way in which products or services are provided, but their very nature. Telephone systems and computer service bureaus are very clearly shaped by their technology. Breakthroughs in equipment were what made possible the large-scale production and broad distribution of content - books, newspapers, photographs, records, radio, motion pictures, television, and cable. Refinements and new applications of these technologies such as video-cassette, videodisc, direct broadcasting by satellite and cellular mobile radio may have a major effect on the evolution of both carriers and content producers. Even more radical changes may come about from applications of optical technology such as fibre optic transmission, laser printing and optical computing.

2. Equipment purchases

Purchases of equipment by other parts of the sector are also important in dollar terms. Telephone companies spent \$1,219.3 million on central office equipment and station apparatus in 1977. This was equal to 84.6% of the sales of all Canadian manufacturers of communications equipment, which totalled \$1,441.3 million. Data processing equipment is bought largely by end users, but service bureaus account for 14% of the total according to Department of Communications estimates.

Many communications/information products and services also require the customer to have equipment on his own premises, whether owned by him or by a service supplier. Examples include television and radio receivers, telex terminals, telephones, computer terminals, and playing equipment for records, audio and video tapes and videodiscs.

3. Product delivery

Product delivery is a critical function which some industries in the sector perform for others. This role is played in its simplest form by common carriers, such as the telecommunications companies and the post office, who will transmit a virtually unlimited number of messages for anyone who will pay. These channels can be used by other companies in the communications/information sector to deliver their product or service to end users, rather than establishing their own delivery system. Examples include:

- remote computing and electronic information services, which rely on the data transmission facilities of the telecommunications companies;
- magazines, and to some extent newspapers, delivered to subscribers by mail. There were 501 million pieces of second class mail in 1979/80, 7.8% of the total volume of originating mail;
- books delivered by mail, for example for book clubs;
- telegrams delivered orally by telephone and in hard copy through the mail. There are also hybrid services such as Telepost (Telex/mail) and Intelpost (facsimile/mail);
- CNCP long haul data communications services, which under the CRTC's decision on interconnect can be delivered using the local loops of Bell Canada.

The same facilities are also used to deliver intermediate products. Examples are:

- network television programs transmitted to individual stations by microwave and satellite;
- long distance calls transmitted for the telephone companies by satellite operators, i.e.: Telesat and Intelsat (the Canadian interest in which is held by Teleglobe);
- news service copy, including photographs, transmitted to newspapers and broadcasters by wire; and
- newspaper final copy, transmitted via satellite for remote printing, as in the case of the Globe and Mail.

Cable companies provide a form of delivery service in extending the geographical coverage of television stations. However, this is a mixed blessing from the standpoint of the broadcaster, since cable companies also import competing stations into his own local coverage area.

Libraries provide a somewhat similar service by lending books, magazines, newspapers and in some cases records and films. This service makes the product available to consumers, but there is no direct charge to them, and the producer receives revenue only from the sale to the library.

Broadcasters may also be thought of as delivering the output of program production companies to viewers. However, this is not simply a delivery function because capacity is limited by economic, regulatory and to some extent technical factors. The broadcast licence holder therefore assumes the functions of selecting programs, arranging them in a schedule, and selling advertising time to finance his program purchases and other costs. In Canada, broadcasters also carry out a substantial part of the program production function themselves, either directly or through subsidiaries.

The delivery functions of movie theatres, bookstores and newsstands are somewhat similar to those of broadcasters. Economic factors limit the number of movie screenings and the shelf space in bookstores and newsstands, so a selection of content is made. However, there is generally a sharing of risks with the content producer through the right to return unsold copies or through the division of box office receipts.

The delivery services of the post office are also used extensively in the administrative operations of other communications companies, for example:

- billing and payment for telephone service;
- billing and payment for cable service; and
- subscription correspondence for magazines and book clubs.

4. Marketing/Consumer Information

Many communications/information products and services repay substantial marketing effort. Moreover, from the standpoint of the consumer, there is a high degree of interest in product information, to the point where he may be happy to pay for such information. Some of the reasons are that:

- content products are not regarded as necessities. Shopping for them therefore becomes a form of recreation itself;
- for mass-market cultural products such as television programs, paperbacks, feature films, and "top 40" records, there is a constant stream of new items, each with its own characteristics. Obsolescence can be rapid because the distribution channel for such products can only profitably accomodate a small number of items at any one time, and novelty itself may be a selling point. Achieving rapid public acceptance is therefore critical;
- some products are offered only at specific times, such as television programs and movies;
- some product lines are relatively new and penetration of the potential market is low, as in the case of micro-computers, videocassette recorders and electronic information services; and
- some products are bought infrequently, and the amounts involved are large from the buyer's standpoint. This is true both for consumer items such as television and stereo sets, and for business items such as computer hardware, software packages and word processing equipment.

In parts of the sector, a company can use its own output as an advertising vehicle - television stations advertising coming programs, cinemas showing samples of coming attractions, magazines promoting subscriptions, and mass market paperbacks including order forms for similar books.

Many outputs are also advertised through other media. In some cases, the message is directed to a broad public, for example television advertising for long distance telephone service or for certain records, or telephone

promotion of newspaper subscriptions. In other cases, a particular medium may be ideal as a method of reaching a specialized group - EDP trade magazines for software packages and computer equipment, special interest consumer magazines or their mailing lists for book clubs focussing on the same field, or television for selling TV sets and videocassette recorders.

What is remarkable, however, is that the consumer's desire to know about certain communication/information products is strong enough that other media will provide that information to consumers without charging the company whose product is, in effect, being promoted. Newspapers provide listings of television programs and weekly television supplements. Reviews of films, books and records are included in many newspapers and magazines. Indeed, there are paid circulation magazines devoted entirely to television listings, and more specialized magazines about films, books and records. There is also an element of product information, though less explicitly, when television stations interview authors, musicians and film stars and when radio stations play new records. However, this kind of activity blends into our next category, where one medium is a source of content for another.

5. Content Source

There are a number of instances where the output of one industry can be used directly as content in another, either in whole or in part:

- playing of records by radio stations;
- showing of films over television;
- sale of sound track recordings from films;
- selection of newspaper articles by clipping services, or through more sophisticated electronic services such as Infoglobe; and
- paperback versions of hard cover books.

In other cases, the output requires considerable adaptation to a different medium, for example:

- movie, television and more recently audio cassette adaptations of books;
- book versions of movie scripts;
- magazine and newspaper excerpts of books;
- film and television programs dubbed into other languages; and
- translations or adaptations of books.

These various "subsidiary rights" possibilities have led in recent years to sophisticated merchandizing campaigns where each version of the product is "tied-in" to help promote sales of the others.

News services are a more complex case since they are designed as a source of content for both print and broadcast media, as well as being delivered directly to end users in certain cases, such as the Dow Jones News Service and the news channel provided to some cable companies by Broadcast News.

Sub-sectors

While the various industries within the sector are linked together in important ways, their economic characteristics often differ significantly. Telephone companies are not much like book publishers or computer manufacturers. However, they do have important characteristics in common with cable companies or the post office. We have therefore divided the sector into four sub-sectors:

- carriage;
- equipment;
- content; and
- computer services.

It should be emphasized that, in adopting this classification, we are making no presumptions about whether it is proper for one company to be both a carrier and a content producer. It is simply that we have found in the course of our work that the two types of activity tend to have different economic characteristics, so that a separation for purposes of analysis is useful.

III - ECONOMIC SIGNIFICANCE AND PERFORMANCE CRITERIA

The conventional way of assessing the economic significance of a sector is on the basis of its share of gross national product or employment. On that basis, the communications/information sector is of substantial but not overwhelming size.

Statistics

Statistics Canada indicates that the communications sector accounted for about 2.7% of gross domestic product at factor cost in 1979,* and a similar proportion of wages, salaries and supplementary labour income. However, their definition includes only the carriage sub-sector (telephone and other telecommunications, postal service and cable television) and the broadcasting industry. Our definition of the communications/information sector also includes equipment production, computer services, publishing and various other content production and distribution activities. Rough calculations suggest that the elements of the communications/information sector on which we have focussed account for about four percent of GDP and over 300,000 jobs in 1979. If related activities such as commercial printing and the retailing of books, magazines and records were included in the numbers, they would obviously be higher. Another major increment would be if one were to include in-house activities, such as data processing which accounts for expenditures of \$2.6 to 2.8 billion and 110,000 jobs, according to estimates by Department of Communications officials.

Infrastructure Role

However, we believe that such calculations tend to obscure rather than highlight the economic significance of the communication/information sector. This significance rests on the fact that it is a critical part of the economic infrastructure, but in a much broader sense than that word is normally given.

* Statistics Canada Catalogue 13-201, Annual. To be precise, Statistics Canada treats communications as a major group within the Transportation, Communications and other utilities sector.

The roles of telecommunications and postal services in permitting the co-ordinated operation of business enterprises and governmental bodies on a regional, national and international scale is so evident that most of us are hardly aware of it, except to some extent during postal strikes.

Major business enterprises and governments have also come to rely heavily on EDP, office automation equipment and related software, whether owned by them or used through the facilities of service bureaus. This reliance began in the accounting function, but increasingly takes in the paperwork and the day-to-day control of operations in all aspects of the business. The use of such technology is of vital importance in improving the productivity of our economy, because over 40% of the labour force is now said to be employed in "information occupations".* Microelectronic technology is also of growing importance in design activities, and can be expected to play a gradually increasing role in manufacturing itself, and as an element in a wide variety of end products such as appliances.

The communications/information sector also provides the infrastructure for advertising in the form of television, radio, newspapers and magazines. As individuals, we find some advertising annoying and seek some out as a useful, if not objective, source of information. But either way, a complex mass consumption economy could hardly function without advertising.

Content production, and particularly publishing, is also vital to the basic and continuing education of a sophisticated labour force. The development of this human capital can also be seen as an infrastructure function.

* "The Information Revolution and its Implications for Canada", a paper prepared by Shirley Serafini and Michel Andrieu of the Communications Economics Branch, Department of Communications.

Growth

Growth in the real output of the communication/information sector has been and is likely to remain strong. Real domestic product in the communications sector (as defined by Statistics Canada) rose by 112.2% from 1971 to 1980, compared to 38.8% for the economy generally. The volume of messages transmitted, whether by telecommunications or mail, has grown faster than the economy as a whole. It shows every sign of continuing to do so, particularly if some of the much-discussed new services prove to be commercially viable, although growth in some existing services may slow. The range of equipment available for telecommunications and information processing is growing rapidly, and it is becoming more and more affordable, broadening the range of potential applications. The output of content is also likely to increase with the development of new delivery channels such as pay television and electronic information services.

Whether all of this additional real output will result in an increase in the proportion of dollar GNP devoted to the communications/information sector is far less clear. The reason is that technological innovation has tended, and is likely to continue, to reduce the cost of many of the sector's outputs relative to other goods and services. The communications sector in Statistics Canada terms has therefore remained more or less constant as a proportion of gross domestic product since 1965, despite rapid increases in its real output.

Performance Criteria

Our terms of reference deal with the economic development of the communications/information sector. We are therefore concerned with evaluating performance only in economic terms. However, we do not mean to imply that the pursuit of other policy objectives, which may at times conflict with economic development, is undesirable.

The term "economic development" is itself open to interpretation, but we have selected two broad criteria which, in our opinion, summarize the economic performance of the sector.

The first is Canada's balance of trade. Canada cannot expect to have a positive trade balance in every economic sector. Indeed, that would be an absurd objective since the main purpose of exporting is to pay for the goods, services and capital we choose to import. However, it would be useful if Canada could establish a comparative advantage, and hence a positive balance of trade, in all or significant parts of the communications/information sector, in order to offset the other sectors where we are likely to have a deficit. A positive trade balance is also an indication that Canadian industry has at least kept pace with the world in innovation and productivity, and it will tend to be associated with a high level of employment and economic spinoffs in Canada.

The second criterion we have used is the cost and quality of the communications/information products and services available to Canadian households and businesses, compared to those available in other economically advanced countries. A favourable cost/quality relationship is both desirable in itself, and an indication that the efficiency and international competitiveness of other industries which use the sector's outputs is not being hampered.

IV - SOME ANALYTICAL TOOLS

The purpose of this chapter is to explain briefly some analytical tools which underly the discussion in the sub-sector chapters that follow. It also provides a first indication of how they apply to the sector.

Five of these tools - the product life cycle, the growth-share portfolio, learning curves, breakeven analysis and the portfolio effect - are commonly used in the analysis of corporate strategies. The sixth, sector mapping, was developed specifically for this sector by the Program on Information Resources Policy at Harvard University. Each is discussed separately below.

Product Life Cycles

The product life cycle, illustrated in Exhibit 4-1 opposite, is a well established concept for projecting growth rates and analyzing marketing strategies. It can be applied at the level of industries as well as specific products and models. The product life cycle is generally broken into four stages:

- introduction, during which sales are low and growth may be relatively slow. Usually there are only a few producers, who are faced with working out technical problems, building up production capacity and distribution channels and developing customer awareness. Prices are generally high, as are promotional expenditures per dollar of sales. Because of low sales and high costs, producers generally face losses.
- growth, during which sales increase rapidly. The number of competitors tends to increase, and prices may be cut sharply to accelerate growth or discourage entry by other firms. Production costs per unit generally decline substantially, and the quality of the product improves. The business generally becomes profitable, even highly profitable, during this stage.
- maturity, when the product or service has become well-established. Product sales in this phase are dependent largely on replacement and population growth, while service volume growth is gradual. The maturity stage

PRODUCT LIFE CYCLE

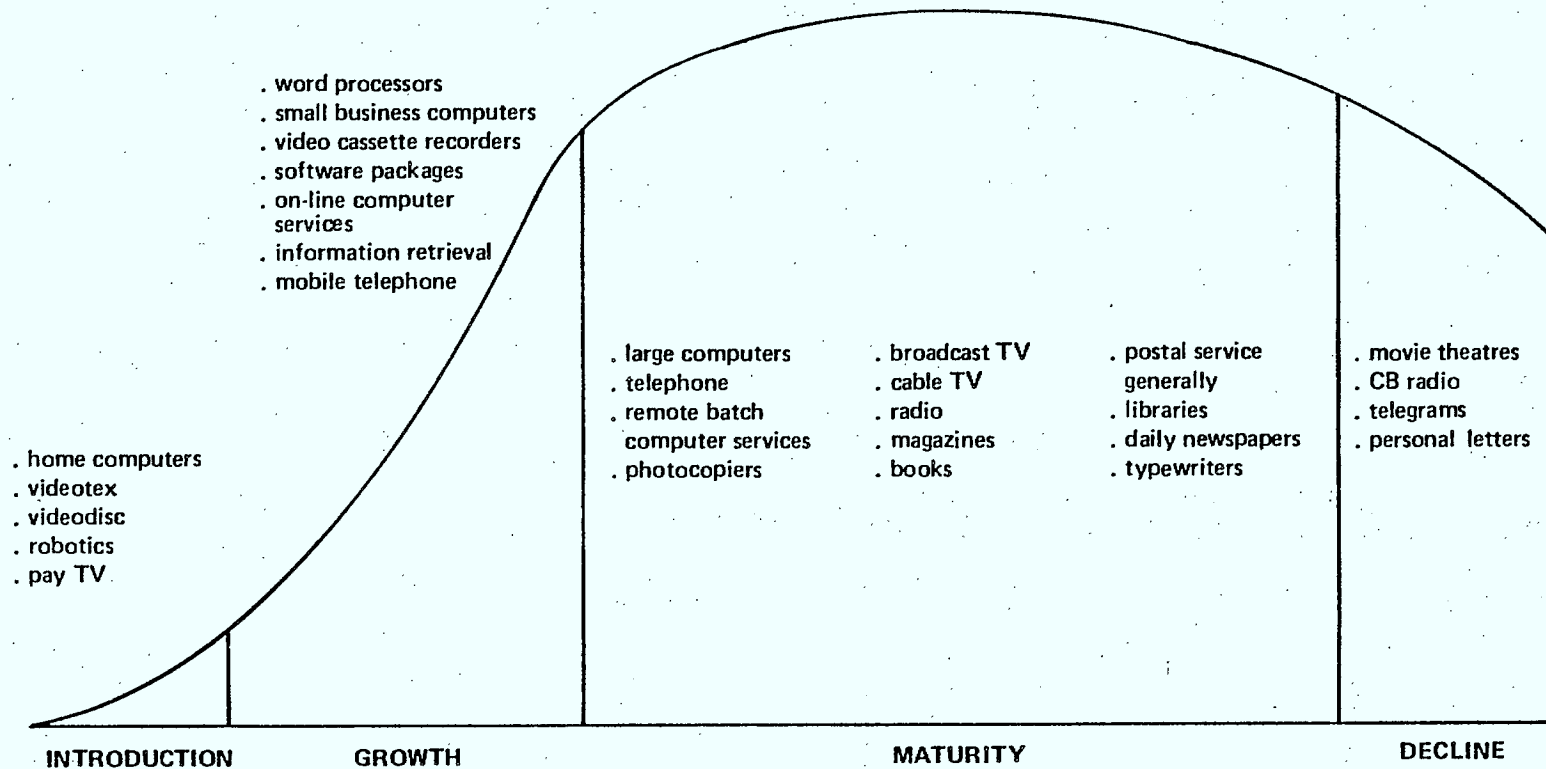


EXHIBIT 4-1

may be long, even indefinite, if no superior product is developed. Profit margins decline to more normal levels, forcing weaker competitors out of the industry. Major producers become well-established, and market shares stabilize. Competitive efforts generally focus on adding features, increasing market segmentation or reducing prices temporarily.

- decline, which may be rapid or very gradual. The number of firms generally declines, as do promotional expenditures and the number of product offerings.

Exhibit 4-1 shows a preliminary life cycle classification of products and services for Canada. One striking aspect is the difference in the rate at which products pass through the life cycle. CB radio, for example, appears to be well into the decline phase of its brief but spectacular history. The telephone, on the other hand, remains in the early part of the maturity phase, with volume continuing to grow appreciably faster than population.

Individual models of products may have a much more abbreviated life cycle. This is particularly true for mass-market cultural products such as television programs, paperbacks, feature films, and "top 40" records. The distribution channel for such products can only profitably accommodate a small number of models at any one time, and novelty itself may be a selling point. Items which do not receive rapid public acceptance are therefore dropped. On the other hand, successful items may enjoy a long commercial life. Obsolescence can also be rapid in areas where technology is improving quickly. This has been particularly evident for computers and associated software.

Growth-Share Portfolio

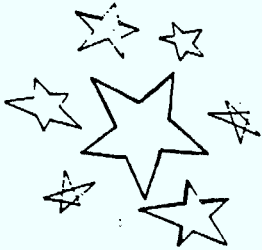
The growth-share portfolio model, shown in Exhibit 4-2 opposite, was developed originally by the Boston Consulting Group. It combines the concepts of the product life cycle and economies of scale.

GROWTH - SHARE PORTFOLIO

PRODUCT
SALES
GROWTH
RATE

HIGH

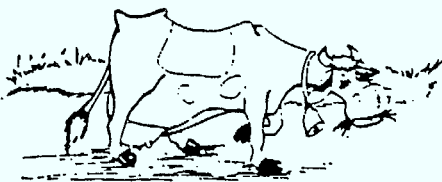
STARS



QUESTION MARKS



COWS



DOGS



LOW

HIGH

LOW

OWN MARKET SHARE
LARGEST COMPETITOR'S SHARE

Economies of scale are important in this kind of strategic analysis because a firm with a larger share of the market is able to spread its research and development, marketing and other overhead costs over a larger number of units. This will permit it to outspend its competitors in absolute dollars, and yet be more profitable on a percentage basis. The largest firm will also find it easier to secure distribution channels for its product.

In the growth-share portfolio approach, products are classified into four categories on the basis of a) the growth rate in the total market for the product, and b) the company's own market share relative to that of the largest competitor. The four categories and the strategies normally recommended for them are as follows:

- stars, which are in the introduction or growth phase of the product life cycle, so that the market is growing rapidly, and where the company has the largest single share of the market. These products are profitable, but additional investments are needed to meet growth and should be made.
- cows, which are in the maturity or decline phase of the product life cycle, so that market growth is modest, but where the company has the largest single share of the market. These products are profitable, but do not justify large additional investments. They are seen principally as a source of cash flow for investment in growth areas.
- dogs, which are in the maturity or decline phase of the product life cycle, and where the company is not the largest competitor. Divestiture is normally recommended, and additional investments are certainly to be avoided.
- question marks, which are in the introduction or growth phase of the product life cycle, but where the company is not the largest competitor. These products pose the most difficult strategic problems. The recommendation is that the company choose either to support the product aggressively in order to move it into the "star" category, or sell the operation.

The growth-share portfolio model is somewhat simplistic, but generally provides a good explanation of corporate strategies in the communications/information sector. For example:

- newspaper publishers have tended to treat the leading daily papers as "cows", using the cash they generate to invest in higher-growth areas such as broadcasting, or outside the sector entirely. Second newspapers in all but the largest cities have been treated as "dogs" and closed down;
- Xerox is using cash generated by the photocopier business, a "cow", to attempt to establish a stronger position in other aspects of office automation, a "question mark" for them. It also attempted to enter the long haul business communications market with XTEN, but abandoned the venture;
- Northern Telecom is continuing to invest heavily in the telephone equipment business, a "star", but is also seeking to establish a position in office automation, a "question mark" at this stage;
- cable television operators such as Rogers Cablesystems, whose existing network are "cows", are trying to attain "star" status in other areas such as the US cable television industry, Canadian pay television and new home services; and
- smaller equipment manufacturers such as Mitel and Gandalf have sought out rapidly growing niches in the market which larger firms have overlooked, and where they can therefore attain a good market share. These companies generally avoid head-on competition with companies the size of Northern Telecom.

These principles can also be applied to the formulation of economic strategy on a national basis. Canada's share of the world market for most communications/information products is now rather modest. This suggests a strategy of finding a limited number of niches in highgrowth parts of the sector, such as telephone switchgear, and attempting to gain a large share of those markets. Large investments by government in developing Canadian capability in mature parts of the sector would be difficult to justify on the basis of economic development. We will return to this subject when we discuss policy issues at the end of the report.

Learning Curves

Another strategic planning concept which has been applied frequently in high technology industries such as aircraft manufacturing and semiconductors in the learning curve. Texas Instruments is one company commonly associated with the concept.

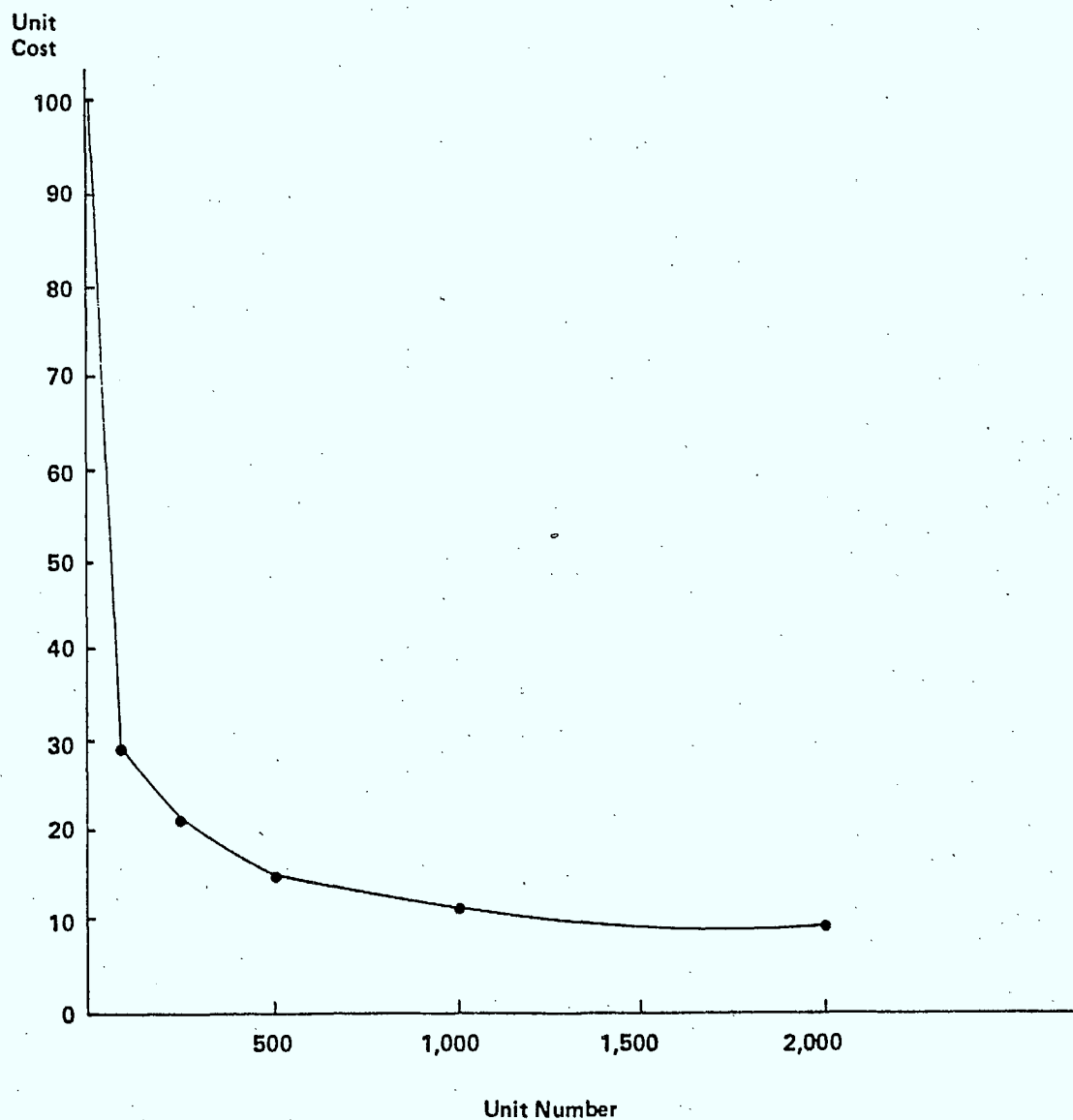
The critical assumption, illustrated in Exhibit 4-3 opposite, is that the cost of completing a given task or unit of a product will be less each time the task is undertaken. The term "learning curve" is used because this effect was originally thought of in terms of labour becoming more productive with experience, but the savings may also be due to improvements in such areas as equipment and the organization of production.

In corporate strategy, learning curves are used to justify a strategy of entering a market early and pricing aggressively in order to maximize cumulative production and develop a cost advantage. This cost advantage may be very difficult for new entrants to overcome unless they are very well financed, and can afford to price far below their initial costs to build up experience themselves. On the other hand, a new entrant may be able to gain from the experience of the industry leader if its methods are well-known or if the new entrant can recruit key personnel from the leader.

Learning curve analysis is consistent with the growth-share portfolio approach in supporting a niche-oriented strategy for Canada in international markets. Where it differs is in suggesting the value of an early start, or of stimulation of domestic sales at an early stage in order to build up production experience. The government has sought to apply this principle to equipment for Telidon.

EXHIBIT 4-3LEARNING CURVE

(Arithmetic plot of an 80 per cent learning curve)



Breakeven Analysis

Breakeven analysis relates the size of the profit or loss on a product to the sales volume in units. The term derives from the breakeven point, which is the level of volume when revenues are exactly equal to costs. However, this type of analysis can also be used to examine the sensitivity of profit margins to changes in volume.

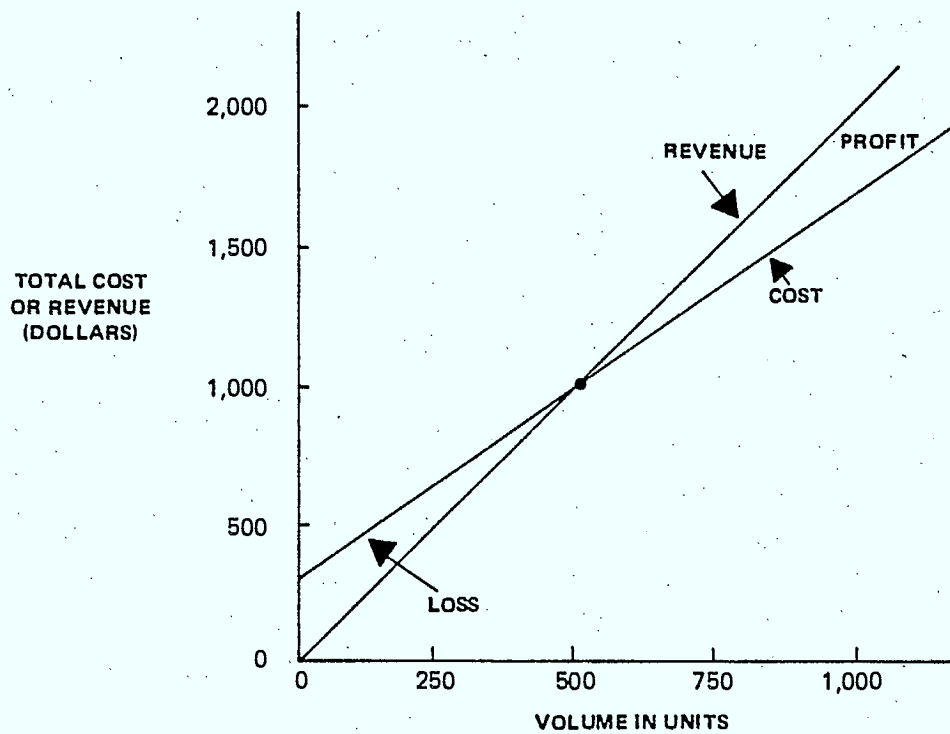
Exhibit 4-4 opposite compares two hypothetical products. They have the same breakeven point. However, the first product has relatively low fixed costs, while for the second product there are high fixed costs and relatively small variable costs. The second product will be characterized by far more spectacular profits, or losses, than the first.

Much of the communications/information sector resembles the high fixed cost example. This is true of telephone and cable systems and computer service bureaus, because they require large investments in capital equipment. It is also true of broadcasting and of individual motion pictures, records and software packages because much of the cost is for the initial development rather than for producing additional copies. The same effect prevails to some degree for high-technology equipment, because of the importance of research and development costs.

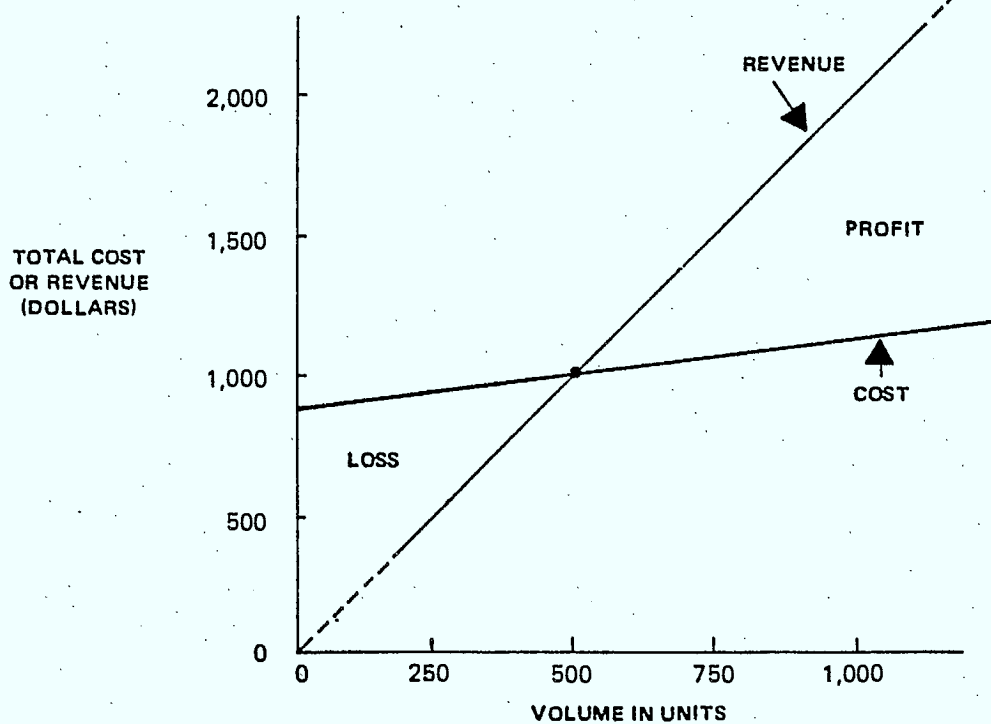
The implications of high fixed costs depend largely on the predictability of demand. For telephone and cable systems, where demand is relatively stable (or growing at a reasonably steady rate), they are not a major problem. In the content and software areas, however, the profitability of individual products is very unpredictable.

EXHIBIT 4-4BREAK-EVEN ANALYSIS

LOW FIXED COSTS



HIGH FIXED COSTS



Portfolio Effect

One of the basic strategies for reducing risk in financial markets is to invest in a portfolio of different projects whose outcome is unrelated. For example, one might buy stock in a copper mine, a paper mill and a bank. While each of these investments may be risky, the chance of all of them failing is slight. On the other hand, the chance of extraordinarily high profits is less than if all the money were invested in a single stock.

The portfolio effect can be applied to reduce risk in industries where products are characterized by high development costs and unpredictable demand. Examples are feature film production, sound recording, book publishing, computer software packages and high-technology equipment. This provides larger firms and conglomerates with an obvious advantage in financing, and might be expected to result in a relatively high degree of concentration.

On the other hand, a single project in these industries may be attractive to an entrepreneur because of the prospect of very high returns if the idea succeeds. If the idea at issue is the person's own invention, he may regard such success as virtually assured. Other factors encouraging the formation of small firms in these industries are:

- the individualism of many artistically and technically creative people;
- the conservatism of many larger organizations; and
- the ease of entry into these industries on a small scale, in many of them because production can be contracted out or facilities rented.

From the standpoint of portfolio strategy, it may also be interesting to invest in two projects with negative covariation. In simple terms, this means that if the first project fails, the second is actually more likely to succeed, and vice versa. This may be one reason why newspapers are interested in investing in videotex systems, despite the uncertainty as to their commercial success. After all, newspapers probably have the most to lose if videotex does succeed.

Communications/Information Sector Map

The Communications/Information Sector Map, shown in Exhibit 4-5 overleaf, is based on a concept developed by the Program on Information Resources Policy of Harvard University.* Our version of the map is somewhat different, and was developed by identifying some eleven dimensions along which activities in the sector could be classified, then selecting those which appeared most critical. One of these dimensions is the same as the Harvard map, but the other is somewhat different, and we think more significant.

The vertical axis represents the distinction between end products or services (at the top) and the means of production (at the bottom). The horizontal axis represents the distinction between carriage (on the left) and content (on the right). The meaning of these axes becomes clearer from the specific products and services placed in the corners.

- carriers who are uninvolved with content and who provide an end-to-end service, such as postal and telephone services, are in the top left corner;
- equipment used directly in such carriage activities, such as switching equipment and earth stations, is in the bottom left corner;

* "Mapping the Information Business", John F. McLaughlin with Anne E. Birinyi, Program on Information Resources Policy, Harvard University, July 1980. An earlier version is described in "Converging Strategies in Information: Second Edition" a stock research report by Salomon Brothers, New York, January 1981.

COMMUNICATIONS/INFORMATION SECTOR MAP

28

EXHIBIT 4-5

END
PRODUCTS/
SERVICES

Postal Service
Courier Service
Telephone Service
Telegraph
Telex
Telepost
Intelpost
Paging Services
Mobile Radio/Telephone

Bookstores
Newsstands
Cable TV
Libraries

Newspaper Delivery
TV Broadcasting
Radio Broadcasting
Cinemas
Telephone Answering Service

News Wire

Books
Magazines
Video Discs
Video Cassettes
Newspapers
Sound Recordings

Leased Lines

"White Pages"
Intelligent Networks

"Yellow Pages"
Industry Networks

Bibliographic Services
Service Bureaus

Films
TV Programs
Databanks
Trade Directories
Catalogues

Custom Software
System Houses
Commercial Printing

Satellite Operators
Microwave Systems

PABX's

Systems Software
Film Laboratories

Application Packages
Studio Rentals
Recording Studios

CB Radios
TV Converters
Telex Equipment
Telephones

Telephone Answering Equipment
VCR's
TV Receivers
Radios

Phonographs
Video Disc Players
Microform Equipment
Copiers
Printing Equipment

Mail Sorting Equipment
Switching Equipment
Microwave Equipment
Earth Stations
Satellites
Concentrators
Multiplexers
Wire and Cable
Fibre Optics

Modems

Broadcasting Equipment

ATM's
POS Equipment
Banking Terminals
Computer Terminals
Communicating WP's

Typewriters
Sound Recording Equipment
Video Cameras
Dictation Equipment
Text Editing Equipment
Word Processors
Calculators
CPU's

MEANS

< CARRIAGE

CONTENT >

- content sold directly to final customers, such as books, records and video discs, is shown in the top right corner; and
- the means of producing content, ranging from word processors and sound recording equipment to the central processing units of computers, are in the bottom right corner.

Placing activities along the axes is trickier, more subject to debate, but critical to the usefulness of the concept. For example, in the field of television:

- broadcasting is placed at the top of the map, but in the middle. It is a form of carriage, but the broadcaster also has the function of programming his channel with content. This is regardless of whether the broadcaster actually produces the content;
- the cable TV operator is placed to the left of the broadcaster because he provides a means of access to a wide range of channels, and is therefore only minimally concerned with their content. The cable operator may also be involved in programming or even in producing the content for some channels, but conceptually this is a separate activity. On the other hand, the cable operator is not completely at the left of the content axis because his service is purchased as a means of access to specific content, rather than as a generalized medium of communications;
- the production of films and TV programs is at the far right or content end of the map, but not completely at the top. This is because they are not directly usable by the consumer, but must be broadcast, displayed in a cinema or put into the form of a video tape or video disc;
- television receivers and broadcasting equipment are at the bottom of the map because they are equipment, and in the centre horizontally because they relate directly to broadcasting;

- video cameras and disc players are in the bottom right corner because they are equipment for recording and displaying content respectively.

While the placement of products and services on the map can be difficult, we have found it an excellent method of clarifying concepts. More to the point, the completed map can be used to illustrate:

- the linkages between activities;
- the interrelation of the sector's outputs and how new products would relate to those already on the market;
- the areas with which different government agencies are involved, and the overlaps among them;
- corporate strategies such as horizontal and vertical integration; and
- Canada's areas of economic strength and weakness.

V - CARRIAGE SUB-SECTOR

Description

The carriage sub-sector, as we define it, consists of the following industries:

- . telephone companies;
- . other telecommunications companies, such as CNCP Telecommunications, Telesat and Teleglobe;
- . Canada Post;
- . courier services; and
- . cable television systems.

These companies are common carriers in the sense that they transmit a wide variety of content originated by others, and have little or no involvement with that content. Cable television companies are a partial exception, in that:

- . they operate community channels and other special services;
- . the range of content they transmit is more limited; and
- . their regulation has been concerned to a substantial extent with content rather than their function as carriers.

We have, however, concluded that the economic characteristics of the cable industry resemble those of carriers more than those of broadcasters, and that the future of the industry is more likely to lie in a broader range of carriage functions, including the distribution of pay TV, than in a more intimate involvement with content. We pass no judgement on whether this evolution is desirable from a policy standpoint.

Carriage is the largest single sub-sector, with operating revenues of \$7,640 million in 1979 and total employment of over 162,000*. The subsector itself is dominated by the telephone companies, as shown by Exhibit 5-1 opposite. They account for two-thirds of the operating revenue and three-fifths of the employment in the sub-sector.

Key Characteristics of Demand

Demand for basic postal and telephone services is virtually universal. For example, 97.6%** of Canadian households have at least one telephone. The desire to keep in contact with other households is certainly one reason. However, except for the cable companies, the carriers derive the great majority of their revenues from communications among businesses or between businesses and households.

The primacy of business-related use can be illustrated in a number of ways:

- 60.2% of Bell Canada's local service contract revenues*** and a similar proportion of its long-distance revenues come from business customers;
- 72.4% of Canada Post's cash revenue from mail services in 1979/80 came from postage meters and registers and postage paid in cash by large mailers****. More broadly the Post Office estimates that about 85% of all mail is sent by or to businesses;

* Based on Canada Post Annual Report for 1979/80 and Statistics Canada 56-201, 56-203 and 56-205. Courier services not included. Canada Post revenues include the deficit paid by the federal government as well as the program cost for publication mailings.

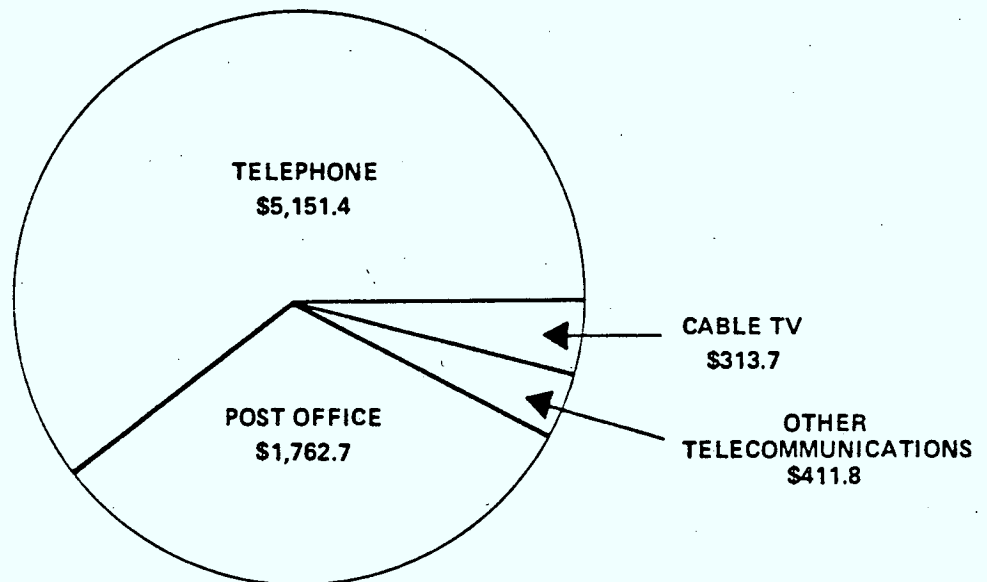
** Statistics Canada 64-202, May 1980.

*** Calculated from the Memorandum of Support submitted by Bell Canada in connection with its rate increase application of February 12, 1981.

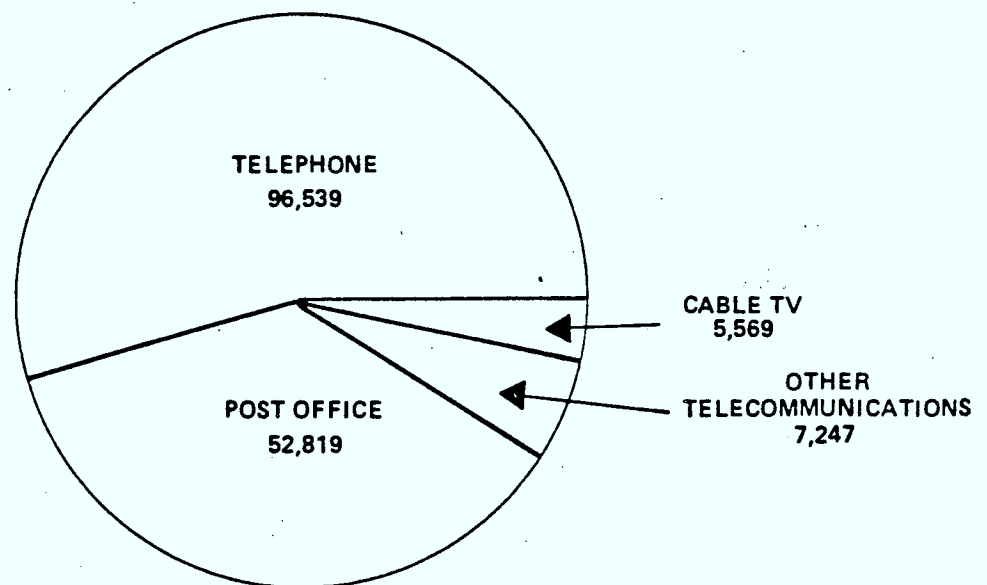
**** Calculated from Canada Post Annual Report, 1980.

CARRIAGE SUB-SECTOR
RELATIVE SIZE OF INDUSTRIES
(1979)

OPERATING REVENUES
(\$ millions)



EMPLOYMENT



Sources: Statistics Canada 56-201, 56-203 and 56-205 and Canada Post Annual Reports.

- a study of United States mail in 1974 showed the following percentages*:

business-to-business	29.7
business-to-household	50.1
household-to-business	<u>6.3</u>
Total business-related	86.1%
household-to-household	<u>13.9</u>
TOTAL	<u>100.0%</u>

- virtually all telex and courier services use appears to be accounted for by business.

A wide variety of factors appear to influence the choices which businesses and households make among different types of carriage. Different services can therefore co-exist to the extent that they serve different needs. Some of these demand factors are:

- direct cost - the heavy use of postal and local telephone service is obviously due in part to their relatively modest cost. Among the various carriage services, mail enjoys an obvious cost advantage for long-distance communications, even with a first-class stamp at \$0.30. However, for telephone subscribers, there is no usage charge for local calls;
- indirect cost - the sender has to devote time to preparing or sending his message - writing or dictating a letter or telex and having it typed, or talking on the telephone. The cost is obviously greater for written than oral communications of a given length. However, if there are a number of addressees, it is likely to be more economical with existing technology to put the message in written form and duplicate it, rather than have an individual repeat it orally;

* Calculated from G. D. Hodge, "An electronic mail system - will it happen?", in Conf. Rec., Inf. Conf. Comp. Commun., Stockholm, Sweden, August 1974, pp. 351-357, quoted in a report to the Department of Communications by Dr. Robert W. Donaldson, January 1977. Figures for business and government combined.

- convenience means such things as the ease with which the other party can be reached, or the degree of disruption in other activities caused by sending or receiving the message. For example, mobile telephone provides a more convenient method of reaching people who are on the road, and telex may be more convenient than telephone for sending simple messages to busy people;
- reliability has been one of the selling points for couriers in competing with mail service, and an area traditionally emphasized by telephone companies. Standards become particularly stringent where data transmission is involved, hence the development of digital services such as Dataroute;
- speed is a clear advantage of electronic media, as well as a selling point for courier services over mail;
- two-way communication is technically feasible with any form of carriage, but it is instantaneous and informal by telephone, compared to the delay inherent in mail;
- a hard copy record is generally considered necessary in business transactions. This may include the need for a signature. Hard copy is provided by telegrams, telex, mail, courier and facsimile services, but not by telephone;
- universality enhances the value of the service to all of its customers. It can be particularly important for point-to-multi-point communications such as advertising and product delivery;
- access to content, particularly U.S. programming, has been the critical factor in demand for cable television services. If demand for electronic information services grows, it may be a significant factor in the growth of telecommunications volume;
- habit or standard business procedure may also play a major role in demand. It can take time for people to learn about a new medium, to become competent and confident in using it and to develop applications. Moreover, some of these applications may involve whole new businesses, such as telephone sales or remote batch computer services, which must develop a market themselves.

Once the use of a particular form of carriage has become well-established, however, it comes to be regarded as normal or necessary. Moreover, the cost is generally minor in relation to the total budget of a business or household. The impact of economic cycles on the demand for carriage services is therefore less severe than for many other items, although the growth of telephone services is certainly affected.

Key Characteristics of Supply

The operations of telecommunications companies, and to a lesser extent of cable TV systems, are very capital intensive, as Exhibit 5-2 opposite demonstrates. This implies very heavy requirements for long-term financing. In the case of the telephone companies, which have a relatively predictable income stream, it has been possible to finance roughly half of these assets with long-term debt. However, the degree of leverage varies widely among companies, and tends to be lower for those which are investor-owned.

The capital-intensive nature of the industry means that much of the labour employed is to maintain the facilities or connect/disconnect subscribers, rather than to operate the system. This implies a high average skill level among employees, and the need for continuing education as technology changes.

In the past decade, major technological improvements such as digital transmission and switching have been introduced into the telephone system to increase capacity, reduce unit costs and facilitate the handling of data and video traffic as well as voice. However, such innovations tend to be introduced gradually because of the long physical life of equipment, the high level of investment necessary simply to meet the growth in demand and practical difficulties in changing the technology of a vast interrelated network. For example, of the \$1,396.3 million in capital expenditures planned by Bell Canada in 1981, \$929.6 million or 66.6% is simply to accommodate demand growth.*

* Memorandum of Support submitted by Bell Canada in connection with its rate increase application of February 12, 1981.

EXHIBIT 5-2NET FIXED ASSETS OF CARRIERS*

	<u>Net fixed assets (NFA) (\$millions)</u>	<u>NFA/ Op. Revenue</u>	<u>NFA/ Employee (\$000)</u>	<u>NFA/ Subscriber</u>
Telephone companies	12,770.8	2.48	132.3	\$806
Other telecommu- nications	798.7	1.94	110.2	N/A
Cable television	348.9	1.12	62.6	\$ 86

* Calculated from Statistics Canada 56-203, 56-201 and 56-205 for 1979.

The technology of the mail system is very different. A large share of mail sorting is now carried out using optical character recognition equipment and automatic sorters, but the pick-up, delivery and counter service operations remain labour-intensive. Salaries and employee benefits accounted for 75.7% of Canada Post's costs in 1979/80.* Moreover, most of this employment was in relatively unskilled jobs.

In all types of carriage services, local pick-up and delivery are more economic when subscriber density is high. This means that less distribution plant is needed per subscriber, or in the case of mail service, that the letter carrier's time is used more productively. One result is that limitations are placed on service in rural and isolated areas. Cable service does not exist in such areas, home delivery of mail is not always available, and Bell Canada charges for construction beyond 165 metres from existing facilities.

The economies of density in local service are one of the barriers to entry in this aspect of carriage. Other barriers to entry in the industry generally are high capital costs, the availability of franchises and the requirement for access to other users, which implies interconnection with existing networks.

Both the telecommunications and mail systems are multi-purpose in that they link together local pick-up/delivery and long distance transmission, and handle a variety of different message formats:

- voice, data, text and video via telecommunications;
- letters, publications and parcels via mail; and
- television programs, FM broadcasts and simple teletext via cable.

* Canada Post Annual Report. No direct comparison can be made with ratios in the private sector since Canada Post has followed the government accounting practice of expensing machinery and equipment.

To the extent that the same physical facilities are used to provide such a variety of services, there is inevitably a measure of judgement in the allocation of these joint costs to particular services.

Industrial Organization

The carriage sub-sector is characterized by a very high degree of concentration, although some aspects are becoming more competitive.

Local monopolies exist in cable television and telephone. National monopolies, whether legally protected or not, exist in:

- . telegraph (CNCP Telecommunications);
- . overseas telecommunications (Teleglobe);
- . domestic satellite operations (Telesat); and
- . postal service (Canada Post).

The telephone and cable industries, while they are monopolies only on a local basis, are highly concentrated nationally. Bell Canada and its affiliates accounted for 67.0% of all telephones in Canada in 1978.*

The telephone companies are also tied together through the Trans-Canada Telephone System (TCTS), an association which ensures integration of the telephone network on a national basis and administers the sharing of inter-carrier revenues. Telesat is also closely linked to the telephone companies through their control of its Board of Directors and Telesat's membership in TCTS.

In cable systems, there have been several significant mergers in recent years. As a result, Rogers Cablesystems and its associates now account for 1.2 million subscribers in Canada,** or close to 30% of the total. Other major companies include Maclean-Hunter and Videotron/Cablevision Nationale.

* From a report by Arthur D. Little, Inc.

** Financial Post Corporation Service. Data as of August 31, 1980.

Direct competition among carriers is limited at present, though substitution of one service for another is always a possibility. CNCP competes with the telephone companies in Telex/TWX, where it has a dominant position, and in data communications, video transmission and private line services. The post office faces competition from substitutes such as private delivery services in business-to-household market, courier services in the business-to-business market and potentially from electronic funds transfer systems.

The carriage sub-sector is heavily Canadian in terms of ownership. The only major exceptions are B.C. Telephone and Québec-Telephone, controlled by GTE in the United States. There was also a substantial element of American ownership in cable systems up until 1968, when the CRTC established a 20% limit on foreign ownership of any licensee. More recently, Canadian cable companies such as Rogers and Maclean-Hunter have reversed the situation by expanding into the U.S., where cable penetration has been much lower but is now expanding rapidly because of pay TV.

Government Involvement

Governments, and particularly the federal government, are heavily involved in many aspects of carriage. This involvement originated from the fact that carriage is a critical part of the economic infrastructure, and many aspects have been seen as a natural monopoly.

A natural monopoly exists when the minimum average cost of production (or service) for the firm occurs at a volume of production which is equal to or greater than the total market demand. If the market were split between two firms, each would have an incentive to cut prices in order to increase sales, since its average costs would also decline. The resulting price war would result in one of the firm being driven out of business, with the other remaining as a monopolist.* It should be noted, however, that the

* "Microeconomic Theory", C.E. Ferguson, Richard D. Irwin, Homewood, Illinois, 1969, p. 255. In principle, a natural monopoly may also exist if the level of output which minimizes average cost is slightly less than the total market demand.

concept of a natural monopoly assumes an undifferentiated product. If the smaller firm can differentiate its product sufficiently that consumers will pay a premium price, it may be able to remain in business indefinitely, even though its costs are higher than the larger supplier. Moreover, because natural monopoly results from the structure of production costs, changes in technology can make competition viable in industries which were once natural monopolies, and vice versa.

The federal government is the sole shareholder of Canada Post and Teleglobe, and has substantial interests in CNCP Telecommunications and Telesat. Provincial governments control Alberta Government Telephones, Saskatchewan Telecommunications and the Manitoba Telephone System, while municipalities control the systems in Edmonton and Thunder Bay.

The rates and services of all carriers, other than courier services, are regulated in one form or another. The CRTC is the most powerful of the regulatory bodies, with jurisdiction over Bell Canada, B.C. Telephone, Telesat and the cable companies. Some of the specific policies adopted by the CRTC include requiring:

- . Bell Canada to allow CNCP to interconnect with its local network;
- . Bell Canada, on an interim basis, to allow the interconnection of subscriber-owned terminal equipment;
- . cable companies to own at least the subscriber drops and devices;
- . cable companies to provide community programming; and
- . telephone companies to establish special programs to upgrade service in non-urban areas.

In a regulated environment, the price of a particular service may not correspond closely to its cost. For example, Bell Canada argues that revenues from basic local service are only 54.3% of the associated costs, as shown in Exhibit 5-3 overleaf. The deficit on local service is said to be

BELL CANADA ESTIMATES
OF COST/REVENUE RELATIONSHIPS BY SERVICE CATEGORY FOR 1980

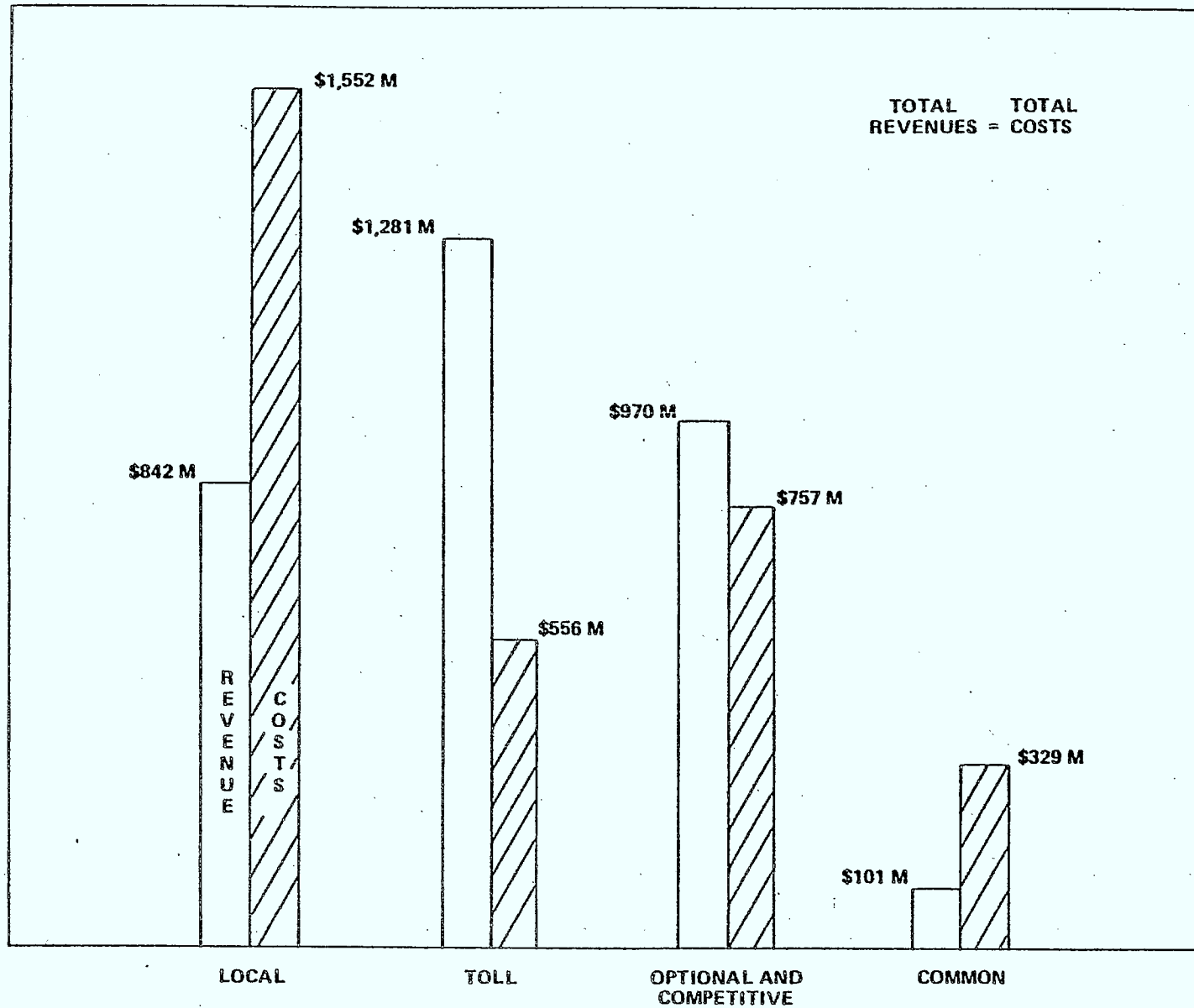


EXHIBIT 5-3

covered by a surplus on long-distance toll service, where revenues are 230.4% of costs according to Bell.* These specific figures may be disputed, but there does appear to be an element of cross-subsidy. This may be in the interests of the carrier, however, since basic local service may act as a loss leader, indirectly promoting demand for services such as long-distance.

Cross-subsidy may not be simply a question of rate setting. A regulated firm may be required, as a condition for a license to do something profitable, to provide a service which it would not itself choose to provide, or not to that extent. Examples include community programming on cable television, and Canadian content in television and AM radio broadcasting.

In other cases, a service may be subsidized directly by government. Examples of federal subsidies for carriers include those for publication mailings, for postal service generally and for northern telecommunications.

Governments are also major users of telephone, mail and other carriage services. The federal government therefore established the Government Telecommunication Agency (GTA) within the Department of Communications to coordinate its telephone services, and particularly the leasing of long-haul lines. The Department of National Defence also has special needs for high security communication and for links with remote sites. In the area of mail, any decision by the federal government to use electronic funds transfer for payments such as family allowances and old age pensions would mean a substantial decline in postal volume.

Federal government involvement also includes the regulation by the Department of Communications of radio frequency spectrum use. Critical policy areas include the licencing of microwave systems, where preference has been given to common carriers, and of mobile radio systems.

* "Report on the 5-Way Split Study of 1980", Bell Canada, May 25, 1981. Optional and competitive services include private branch exchange systems, extension telephones, push-button telephone systems, key equipment, answering boards, Contempra telephones, data connectors, automatic dialers, tie trunks, foreign exchange service, off premises extensions, Dataroute, Datapac, Voicecom, Multicom, TWX, Telpak channels and data transmission terminal equipment.

Performance

1. Trade

The economic performance of the carriage sub-sector cannot be evaluated in terms of the trade balance because trade as such has been virtually non-existent in the past. The pick-up and delivery of messages, whether on paper or through telecommunications circuits, is an inherently local activity. Long-distance transmission between two points within the same country has generally been carried out over domestic routes, both because that would generally be the shortest path and also because dependence on communications lines across another country would raise issues of national security and economic sovereignty. Arrangements do, of course, exist for long-distance transmission between points in different countries, but these do not generally involve an export or import of services because the revenues are split between the sending and receiving countries.

Trade may become a factor in the future, because communications satellites make distance less significant in telecommunications costs. This raises the threat or opportunity that a satellite controlled by interests in one country could be an economically competitive means of transmitting voice, data or video signals between points in another country. Expertise in telecommunications is also exportable, as demonstrated by the activities of Bell Canada International, and particularly their recent contract with Saudi Arabia.

2. Quality and Service

Performance in the carriage sub-sector must therefore be evaluated in terms of the quality and price of the services provided.

We have tended to congratulate ourselves as a nation on the quality of our telecommunications services. This includes the speed with which technological innovations such as digital transmission and switching, packet switching and communications satellites have been introduced. The reliability of

basic service has also been a matter of pride. However, the record of some telephone companies is apparently not as good as others, and the quality of service in cable television is also said to vary considerably.

There is some concern that new telecommunications technologies are not being implemented as fast as could be justified economically because of:

- the long depreciation periods approved by regulatory authorities, which make it difficult to justify both the replacement of existing assets which are not fully depreciated and the purchase of new ones, which could remain on the books long after they become obsolete;
- the alleged preference of telephone companies for using their own terrestrial facilities even if satellites are more economic;
- the requirement for CRTC approval of new services offered by cable companies; and
- the limits on customer choice, until the recent interim decision of the CRTC, with respect to terminal equipment.

The speed and reliability of postal service have been subjects for widespread complaint, although some of this criticism may be exaggerated. In recent years, Canada Post has attempted to respond to the needs of customers, particularly businesses, through the introduction of new services such as Telepost, Intelpost and Priority Post. However, these are yet to become major revenue sources.

3. Prices

Price increases for telecommunications have been far below the general rate of inflation for the past several decades. For example, the Consumer Price Index rose by 110.6% between 1971 and 1980, while telephone rates rose 34.6%. Rate increases for Telex have also been moderate. These low rates of increase have been possible due to labour-saving innovations such as direct distance dialing, electronic switching equipment which requires less

maintenance, and more recently the introduction of jacks to reduce installation labour and of the T.O.P.S. system to make more efficient use of operator time. The use of microwave transmission systems has also reduced costs for long-distance transmission.

Whether prices for telecommunications services in Canada are attractive compared to those in other countries, and particularly the US, is less clear. Rates for longdistance toll calls are higher in Canada, but local calling areas are apparently larger. A fair comparison would have to be based on a "market basket" of services reflecting the actual requirements of a specific class or classes of customer. No generally accepted comparison between rates in Canada and those for other countries is available at present.

Within Canada, there are very substantial differences in basic service rates between households and businesses, and among provinces. Rates are generally highest in Atlantic Canada and lowest in the Prairies.

Cable television rates are also difficult to compare internationally because of differences in the services offered. However, rates were sufficient to produce a pre-tax return on sales of about 20% during 1972 and 1977, as shown by Exhibit 5-4 opposite. Profitability has declined somewhat in recent years, in part because rate increases have not been rapid compared to inflation.

Until the recent increases, Canadian postal rates were below those in other major industrial countries, and substantially below the level necessary for Canada Post to recover its costs. The low rates cannot be regarded as an indicator of good performance, however, because the resulting deficit must be paid from tax revenues.

EXHIBIT 5-4PRE-TAX PROFITS OF THE
CABLE TELEVISION INDUSTRY

	<u>1967</u>	<u>\$ (in millions)</u>		<u>1979</u>
		<u>1972</u>	<u>1977</u>	
Profit before income tax	1.6	16.8	45.1	49.6
Total revenues	22.1	82.5	229.6	313.7
% Profit/total revenues	7.2	20.4	19.6	15.8
Total subscribers	0.516	1.689	3.417	4.086
Revenue per subscriber	42.83	48.85	67.19	76.77
Profit per subscriber	3.10	9.95	13.20	12.14

Source: Statistics Canada Catalogue 56-205, Annual.

Economic Trends

1. Historical growth

Demand for carriage services has grown at an impressive rate in the past decade, even though most of these services are long-established. Exhibit 5-5 opposite shows the total percentage increases for 1970-79.

What is most impressive, however, is the increase in penetration rates. For example, the number of business telephones per 100 persons employed rose from 36.0 in 1970 to 45.9 in 1979. The number of residence telephones per 100 households rose from 117.0 to 143.6, largely reflecting increases in the number of extensions. The number of cable subscribers per 100 households rose from 19.7 to 52.9. Finally, the number of long-distance calls per capita rose from 21.3 to 50.8 annually.*

Growth rates in some more specialized services have been even higher:

- the growth of overseas long-distance calls has been encouraged by the introduction of overseas direct dialing. Bell Canada reports an increase in overseas calls of 22.7% for 1980**;
- data transmission volume is difficult to estimate, but industry sources believe that it is continuing to grow at 20% or more a year; and,
- demand for mobile telephone and paging services is also reported to be growing rapidly, despite constraints of frequency availability.

While volume growth in the sector seems likely to remain substantial over the next decade, it is doubtful that it can continue at the pace shown in Exhibit 5-6, overleaf. The expansion of the working-age population is slowing. The increase in penetration has diminished for cable TV and extension telephones. The adoption of distributed data processing may tend to moderate the growth in data transmission volume. Price increases may also have a major influence on future growth in volume.

* Calculated from Statistics Canada 56-203 and 56-205.

** Response to Interrogatory Bell (ONT.) 17 March 81 - 108 in connection with C.R.T.C. hearings.

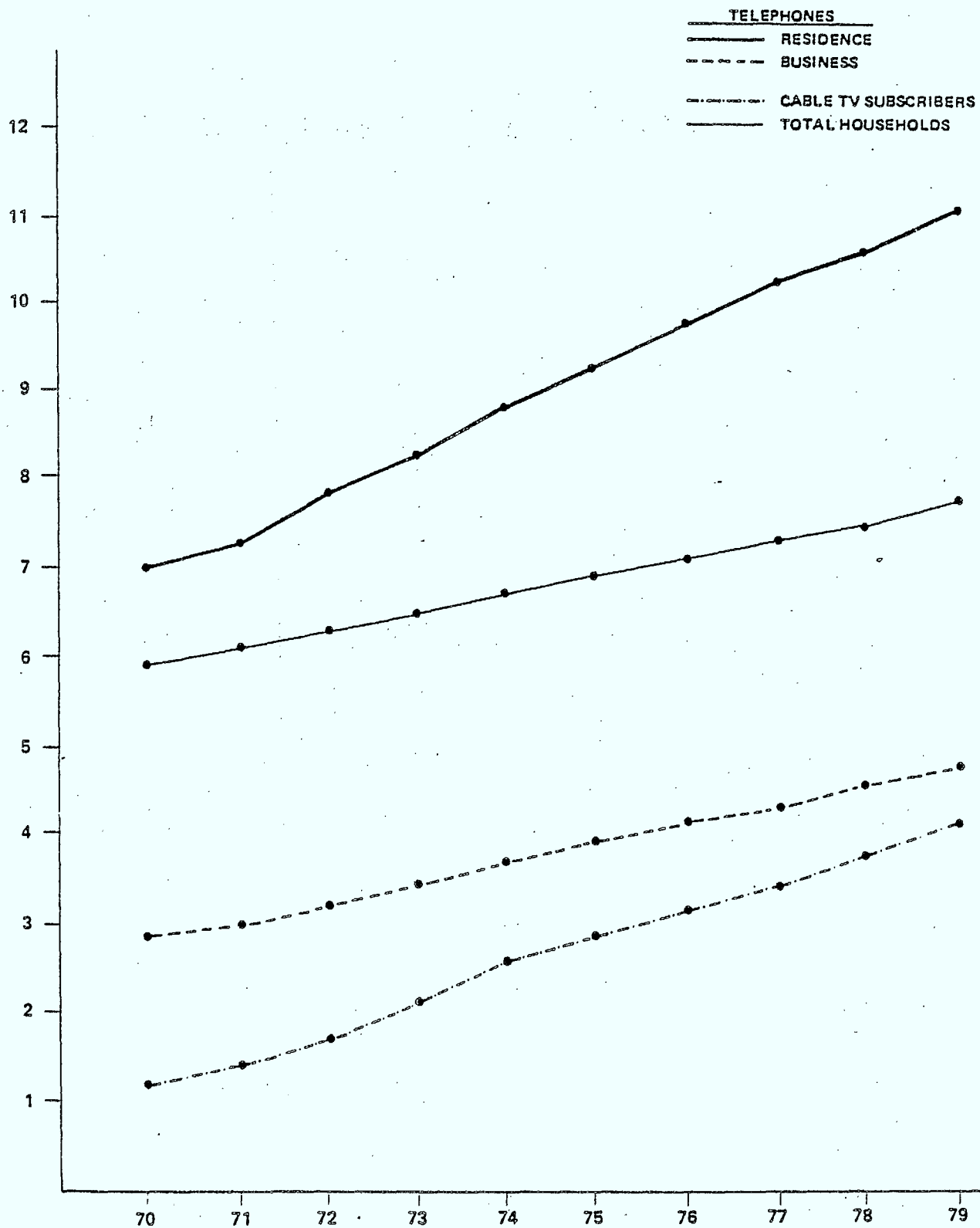
EXHIBIT 5-5GROWTH IN VOLUME OF CARRIAGE SERVICES
(percentage increase in number of units, 1970-79)

250.9%	Cable TV subscribers
164.1	Toll (long-distance) telephone calls
66.8	Business telephones
60.6	Residence telephones
54.7	Local telephone calls
40.8	Mail (total originating pieces, all classes)
-71.7	Telegrams sent

30.9%	Households
30.9	Persons employed
10.4	Population

Source: Statistics Canada 56-201, 56-203, 56-205 and 11-003.

NUMBER OF TELEPHONES AND CABLE TV SUBSCRIBERS
(MILLIONS)



Source: Statistics Canada 56-203 and 56-205.

2. Telecommunications rates

The continuing introduction of electronic equipment into the telecommunications system might be expected to produce further declines in relative prices, particularly since the cost of the equipment itself is tending to drop relative to performance. Digital switching equipment also requires less maintenance, and incorporates redundancy and prompting for preventive maintenance. Computerization is proceeding in other areas such as service orders. Moreover, transmission costs may become less distance-sensitive as satellites and fibre optics become more economic for long-distance point-to-point communications.

On the other hand, a number of factors may tend to increase costs in telecommunications. High interest rates have a very substantial impact on the costs of capital-intensive companies. For example, interest charges were equal to 11.6% of the operating revenue of the telephone companies in 1979,* and this will continue to rise as debt issued as much as 20 years ago is replaced by new debt at far higher rates. Higher nominal rates of return on equity will also be necessary to attract capital.

Second, the introduction of new technology will be gradual because of the tremendous amount of long-lived plant in place. Significant parts of the system such as the "local loop" are also relatively unaffected at present. The introduction of fibre optics into the local loop is a possibility, however, particularly if the telephone network were used for a broader range of services.

A third factor which the telephone companies suggest will tend to increase costs is greater competition in markets such as terminal equipment and long-distance transmission. In part, the argument is that cross-subsidization mandated by the regulatory authorities creates niches where the price charged substantially exceeds the cost of an efficient system. This is said to create opportunities for new suppliers to enter these market niches on a

* Calculated from Statistics Canada 56-203.

profitable basis, even though their costs may be higher than if there were a single supplier. The profits lost by the existing carriers because of decreased volume in these niches would then have to be recouped through price increases for other services in order to maintain authorized profit percentages. Advocates of competition, on the other hand, would argue that the availability of alternatives would encourage greater efficiency, leading to lower overall costs.

How trends in the costs of telecommunications companies will be translated into prices is another question. For a regulated company, the relationship between the cost of a specific service and its price may not be very close. However, Bell Canada has been seeking a reduction in the degree of cross-subsidization. This would imply that rates for basic local service, for which demand appears to be relatively inelastic with respect to price, would rise more rapidly than for services such as long-distance, where demand is presumably more elastic. The impact of price increases on demand growth would therefore be minimized.

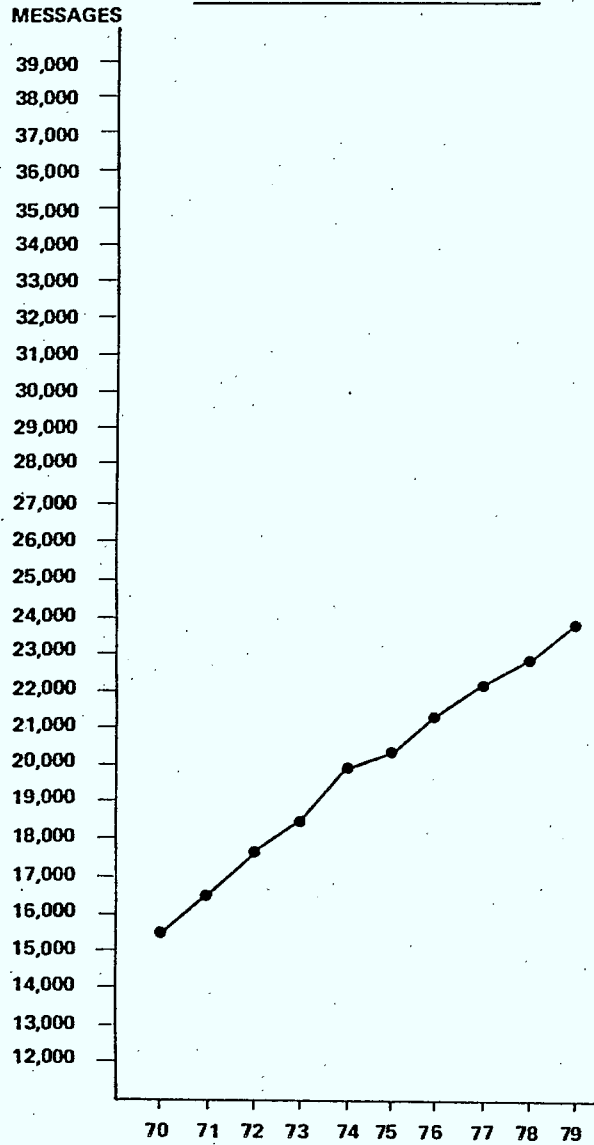
3. Mail volume

In the past decade, mail volume continued to rise more rapidly than population, but not as rapidly as in earlier decades. Moreover, Exhibit 5-7 opposite shows that its growth has been outpaced by that of other carriage services such as telephone. The slowdown in the growth of mail volume appears to be due to the decline of the personal or business letter in favour of the phone call, and to some extent to the growth of courier services, which businesses see as providing faster and more reliable service. On the other hand, the growth in forms of business activity such as credit cards which give rise to business-to-household mail has been sufficient to keep total volume expanding.

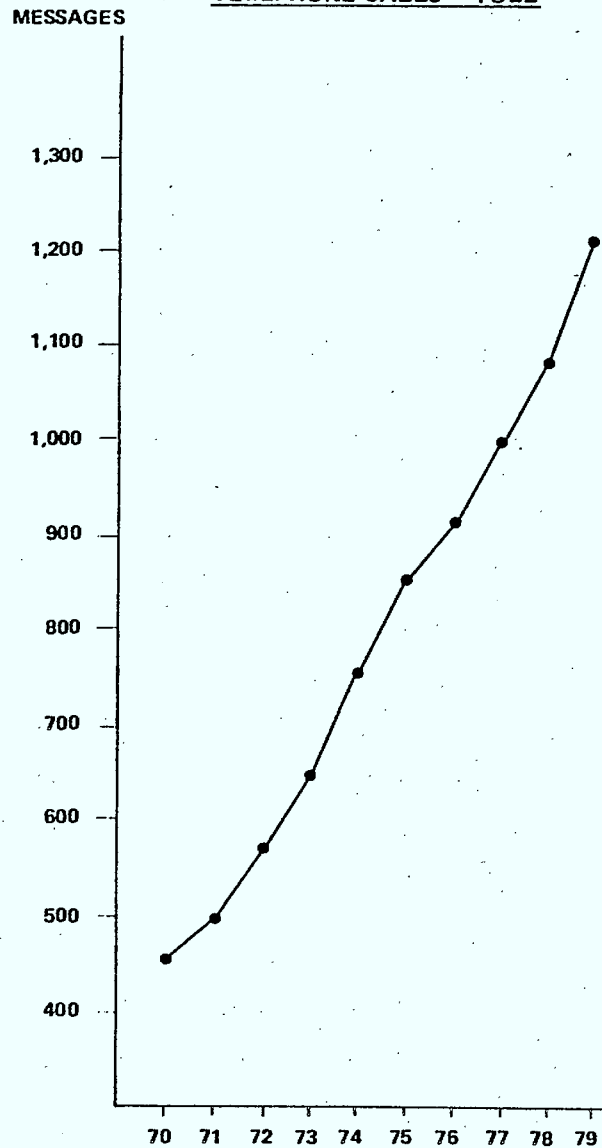
Canada Post has recently announced major price increases, and postal rates are likely to continue rising faster than the cost of living generally for several years in order to reduce the existing deficit. While Canada Post has adopted a strategy of raising prices less sharply for large volume business mailers, who are likely to be the most price-sensitive, some impact on demand seems inevitable.

ANNUAL MESSAGE VOLUME (MILLIONS)

TELEPHONE CALLS – LOCAL

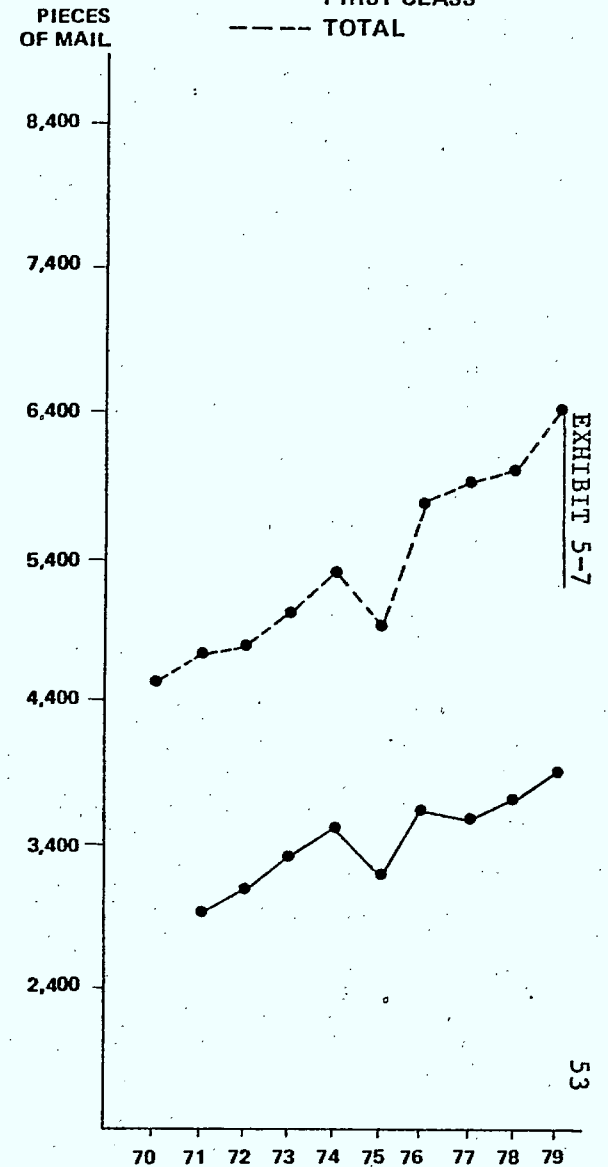


TELEPHONE CALLS – TOLL



ORIGINATING MAIL

— FIRST CLASS
- - - TOTAL



Source: Statistics Canada 56-203 and Canada Post Annual Report.

Postal service faces long term strategic problems because:

- it is very labour-intensive. This includes 22,377 person-years in mail collection and delivery in 1981-82, 24,526 in mail processing, 6,767 in marketing* (largely counter service) and 6,186 in other functions. Opportunities to increase productivity both in the plants and through less frequent household delivery no doubt exist, but labour relations have been so difficult in the past that resistance must be expected;
- it is fairly energy-intensive, with transportation and communications projected to make up 13.0% of operating expenditures this year*;
- for the business transactions which account for a large share of mail volume, the invoice is generally a computer output, and the payment information is input back into the machine. There would be obvious efficiencies if the consumer could deal directly with the computer through an electronic funds transfer system;
- it is inherently slow because it involves the pick-up, handling and delivery of physical objects. Among other problems, letters must be accumulated in batches in order to make efficient use of pick-up and delivery time; and
- rates have traditionally been uniform, despite the higher cost of serving non-urban areas. This cross-subsidization makes Canada Post more vulnerable to competition in urban areas.

Canada Post is responding to these problems partly through the introduction of new services. These include Priority Post, a courier-type service, and two services which combine electronic transmission with physical delivery - Telepost, a Telex/mail hybrid, and Intelpost, an overseas facsimile/mail hybrid. While these are interesting attempts to cater to certain specific business needs, they are unlikely to grow large enough to compensate for any major volume decrease in traditional mail services.

* Estimates, 1981-82.

4. New services

With a possible slowing in growth for their existing services, carriers of all types are interested in the idea of new services, many of them computer-based. The potential for increasing utilization of networks already in place is one of the attractions.

Many of these services are likely to have their greatest appeal to the business market, such as:

- mobile telephone and paging, which have existed for some time but whose growth has been restrained by frequency congestion. The allocation of additional spectrum bands and the introduction of cellular systems, which reduce the number of frequencies required, make more rapid growth feasible. A satellite dedicated to mobile communications in remote areas is another possibility;
- "intelligent" telephones or private branch exchanges incorporating convenience features such as call forwarding, automatic redialing and voice mail. In voice mail, the telephone itself can be used to store and retrieve messages, or direct them simultaneously to several different points;
- message and document transmission services, using communicating word processors or multi-function terminals for input and output. Such systems may be attractive substitutes for Telex, courier services and facsimile, and their greater convenience and lower cost could result in far greater message volume. They are an important element of the "office of the future";
- telephones such as the Displayphone which include a small computer screen for retrieving information from databanks or displaying material during conversations; and
- teleconferencing, long promoted as an alternative to the rising cost and inconvenience of business travel, but perhaps ready to become a major factor at last with improved techniques and with satellite channels becoming more readily available.

Other potential new services directed more toward the household market are:

- pay television;
- automatic alarm systems, including fire, police, medical and other emergency systems;
- utility meter reading and load control systems;
- electronic information systems, including videotex systems such as Telidon;
- transaction systems such as tele-shopping, tele-banking and travel reservations; and
- opinion polling.

Some of the new business services, such as message and document transmission and voice mail, may involve little marginal cost to the user and no major change in business practices. Their acceptance may be quite rapid, and of considerable significance to equipment suppliers. However, their impact on total carriage volume is likely to be modest. Volume could even be reduced if there were less need to return calls.

Other services such as teleconferencing and home transaction systems promise a far more dramatic increase in volume. However, their growth will have to await clear cost advantages, the overcoming of sociological barriers, and in some cases the development of complex software and the resolution of control problems. In the short run, we are more likely to see the growth of less sophisticated alternatives, such as greater use of telephone conferencing, automatic teller machines and pre-authorized payments.

Key Issues

1. Greater competition

Many of the key policy issues in the carriage sub-sector are related directly or indirectly to the introduction of a greater element of competition, both domestically and internationally. This general question has been argued vigorously in relation to the CNCP and terminal interconnect questions in Canada, and to the establishment of specialized common carriers and value added carriers in the United States.

The question of competition will arise in new forms such as:

- whether private delivery services should be allowed to compete with Canada Post in delivering magazines and other material to households;
- whether Telesat should continue to have a monopoly of domestic satellite service, particularly in light of its close association with the telephone companies;
- whether more than one cellular mobile radio network should be established;
- whether there should be a single system or a single carrier for new services such as tele-banking, tele-shopping, remote meter reading and remote alarms;
- whether the industrialized countries will act reciprocally to reduce the non-tariff barriers which still inhibit trade in telecommunications equipment;
- whether a competing public switched network for long based voice traffic with interconnection to existing local loops, should be permitted, or even encouraged;
- whether companies in Canada should be allowed to use U.S. satellite communications systems such as SBS; and
- whether Telesat or another Canadian satellite company should seek to enter the U.S. market, and whether permission for such entry should be a precondition for allowing "landing rights" for U.S. domestic satellites in Canada.

The traditional argument in favour of competition is that it gives the customer a choice, which provides greater assurance of efficiency, service and reasonable prices. With technology changing rapidly, competition may also encourage the introduction of products and services which meet the more sophisticated demand which seems to be emerging.

The case against competition is often based on the argument that it is simply "cream-skimming". The new supplier serves limited markets, such as business in major cities, where profit margins are healthy. This could result in the existing supplier having to raise prices for basic services or to rural customers who have benefitted from cross-subsidies in the past.

A more technical argument made in the case of the telephone system is that interconnection threatens the integrity of the network, and thus the quality of service. However, other mechanisms could be established for setting and enforcing standards.

A more specific argument with respect to terminal interconnection has been that it opens the door to greater imports without any guarantee that other countries will reciprocate by allowing Canadian terminal equipment to compete freely in their markets.

2. Cross-subsidization

The argument that competition will result in cream-skimming immediately raises the question of whether cross-subsidization is, in fact, desirable. The issue of cross-subsidization will have to be addressed with respect to new services as well as telephone and mail. For example, cable companies have not been required to serve uneconomic areas to any major extent to date, because cable TV was not an essential service. But if it becomes the delivery mechanism for tele-banking or other important services, universal access at reasonable cost might be considered of sufficient importance to require extension of cable systems on a cross-subsidized basis.

The most obvious advantage of cross-subsidization is that it provides support for the social equity objectives of government without requiring taxation or direct intervention. It could also be argued that the costing of individual services involves a significant element of judgment in any event, so the joint costs may just as well be absorbed by services considered to be of lesser social importance. Providing a basic service below cost may also serve as a loss leader for the carrier, indirectly promoting growth in demand for related services.

The argument against cross-subsidization is simply that it distorts resource allocation. It may lead to wasteful use of underpriced services, while the higher priced service may become vulnerable to substitution, particularly as technology changes.

3. Companies engaged in both
monopolistic and competitive services

With many of the possible new services, as well as existing services where competition is being introduced, we face the question of whether a company which provides one service on a monopoly basis should be permitted to provide another on a competitive basis. This is an issue with respect to pay television, where it is stated in terms of the separation of carriage and content. Similar issues could arise with respect to videotex services. In telecommunications, the question is whether the existing common carriers should be allowed to continue providing terminal equipment and long distance services, if these are becoming areas for competition, and also whether they should be permitted to expand into competitive areas such as data processing or computer-based message services. If companies are indeed permitted to operate in both monopolistic and competitive segments, the question is how they can be regulated effectively.

The most obvious argument for allowing one company to provide both monopolistic and competitive services is that there may be economies of scope, which could be passed on to consumers. For new services, the existing carrier may also have a stronger motivation than anyone else to promote the development of the service to the extent that it increases utilization of his existing facilities or raises demand for existing services. For example, a cable or telephone company might be prepared to invest more heavily in the development of Telidon service than an independent operator, since the company would benefit from greater use of its existing network, as well as directly from any Telidon usage charges.

On the other hand, there may be inherent difficulties in allocating costs and assets between the monopolistic and competitive services, and hence in regulating companies effectively if they offer both types of services. The regulated monopolist will be motivated to allocate costs and assets to the monopolistic services whenever possible so as to justify higher rates, while leaving him free to price aggressively in the competitive segment if he wishes. Concern has also been expressed that the monopolist may provide unfair marketing support to competitive services because he can control access to the related monopolistic segment. He may also enjoy greater financial strength than his competitors. These concerns about the monopolist's advantages are particularly serious where the competitive service consists of content. The existence of a diversity of content sources may be a critical social objective, above all when the content is information, rather than simply entertainment.

4. Vertical integration

One special aspect of the problem of a company being engaged in both monopolistic and competitive areas is the vertical integration of Bell Canada, which supplies monopolistic telephone services, and Northern Telecom, which supplies telephone equipment both to Bell Canada and other companies. A similar relationship exists between B.C. Telephone and AEL Microtel.

The argument in favour of vertical integration is based essentially on benefits to the equipment industry. Bell Canada now accounts for only one-third of Northern Telecom's sales. However, it is said to provide the base market needed to justify research and development expenditures, which in turn are essential to competitiveness in world markets. The linkage between the two companies is also said to ensure that new products meet the practical needs of telephone companies. At the same time, the successful use of innovative products by a respected carrier provides proof of their practicality. The fact that Bell tends to buy from Northern also serves as a form of non-tariff barrier, protecting the domestic market.

On the other hand, it is argued that vertical integration could result in equipment being purchased which is more expensive or of lower quality than if it were bought on the open market. The growth of small, innovative suppliers in Canada may also be discouraged if they have difficulty in selling to the largest telephone company. For the same reason, customers could be denied access to innovative equipment, although the terminal interconnect decision should help to resolve this problem.

5. Accelerated Introduction

One possible strategy to promote equipment manufacturing in Canada would be to accelerate the introduction of new technologies or services. This might be done by permitting the telephone companies to depreciate the equipment more rapidly, or by some form of subsidy to users. Such a program could enable Canadian suppliers to achieve high volume sales before their counterparts in other countries. This would enable them to achieve manufacturing cost economies due to the learning curve effect, which could provide a vital head start in international competition. Another benefit would be that technologically advanced services would be made available to Canadian users at an early stage. There might even be an actual reduction in costs if the new equipment is more efficient.

On the other hand, a policy of accelerated introduction implies that Canadian consumers or governments would pay the often heavy start-up costs associated with product innovation. While some start-up costs will always have to be absorbed if we are to have manufacturing in Canada, these costs will clearly be higher for a world leader than for a follower who can learn from the mistakes of others. Another risk is that a superior technology will develop elsewhere after we have absorbed these start-up costs, so that the investment would be wasted. Moreover, the essence of the policy is that we would discard existing facilities which remain serviceable and which meet at least the basic needs of customers.

6. Promotion of new transaction systems

Apart from promoting the adoption of new equipment, the federal and/or provincial governments could also play a major role in the introduction of new transaction systems such as electronic funds transfer and tele-shopping, which would be based on telecommunications and computer technology. These systems would involve requirements for large quantities of equipment and software, and the expertise developed could be exportable. This equipment and software might be based on the Telidon concept.

Rudiments of such system now exist in the form of:

- . direct payroll deposit;
- . pre-authorized payments, for example for mortgages and heating contracts;
- . automatic teller machines; and
- . telephone and mail orders from catalogues.

The last revision of the Bank Act also had the concept of electronic funds transfer in mind when it required the creation of a new payments association including the near-banks.

Any system which involves the use of millions of customer-owned terminals for ordering goods and authorizing payments must be able to ensure a very high level of reliability and control. It is partly because of this that we do not foresee rapid implementation of such systems. The government will have to play a role, if only to ensure that the interests of the consumer are protected and because it is itself a major issue of cheques. In establishing its policy, the government should give due weight to the economic development potential of such systems.

7. Canada Post Strategy

As the owner of Canada Post, the government will be faced with major strategic decisions affecting the future of the corporation. The worst case scenario is that Canada Post could lose major parts of its market to electronic funds transfer, to electronic mail and to private delivery services catering to major mailers such as magazines. It would then be relegated to handling low priority, often bulky material and to serving less populated areas. Neither of these is likely to be a profitable activity.

One strategy would be for Canada Post to concentrate on increasing efficiency and reliability in the physical mail business, in order to remain competitive. This could include some reduction in the frequency of delivery to households. Such a strategy could also include further expansion into services such as Priority Post, Telepost and Intelpost which cater to specialized business needs, but still involve physical documents. Acting as the common delivery service for a number of tele-shopping retailers would also be an extension of conventional parcel service.

A more aggressive strategy would be for Canada Post to attempt to enter the field of "electronic mail". However, the fact that electronic funds transfer is likely to be one of the principal applications means that Canada Post would face opposition from the banks and other financial institutions. It will also face a major task in developing its own competence to develop and operate electronic systems. Entry into new fields is unlikely to be successful at least until Canada Post can improve the reputation of its basic service.

VI - EQUIPMENT SUB-SECTORDescription

The equipment sub-sector consists of four industries:

- communications equipment, including transmission, switching and terminal equipment for telephone systems, as well as other forms of communications equipment such as radio transmitters;
- electronic data processing (EDP) equipment, including computers and terminals;
- office automation equipment, including all the electronic equipment found in the office except communications and electronic data processing equipment;
- electronic consumer goods, including television, radio, record playing, recording and related equipment.

The relative size of these industries in 1980 is shown below, based on Statistics Canada information*:

	<u>Shipments</u>	<u>Apparent Market</u>
Communications equipment (including components)	\$2,319 million	\$2,872 million
Office and store machinery	\$ 795	\$1,765
Household radio and TV equipment	\$ 250	\$ 713

As Exhibit 6-1 opposite illustrates, communications equipment accounts for more than half of the market in this sub-sector. It accounts for an even larger proportion of Canadian production, as shown by the shipments data. The office and store machinery industry as defined by Statistics Canada is roughly equivalent to EDP and office automation equipment. The communications equipment industry as defined by Statistics Canada also includes much of production of electronic components in Canada, including "chips". This activity is therefore included in most of the data quoted, although strictly speaking components are not a part of the sector as defined for purposes of this study.

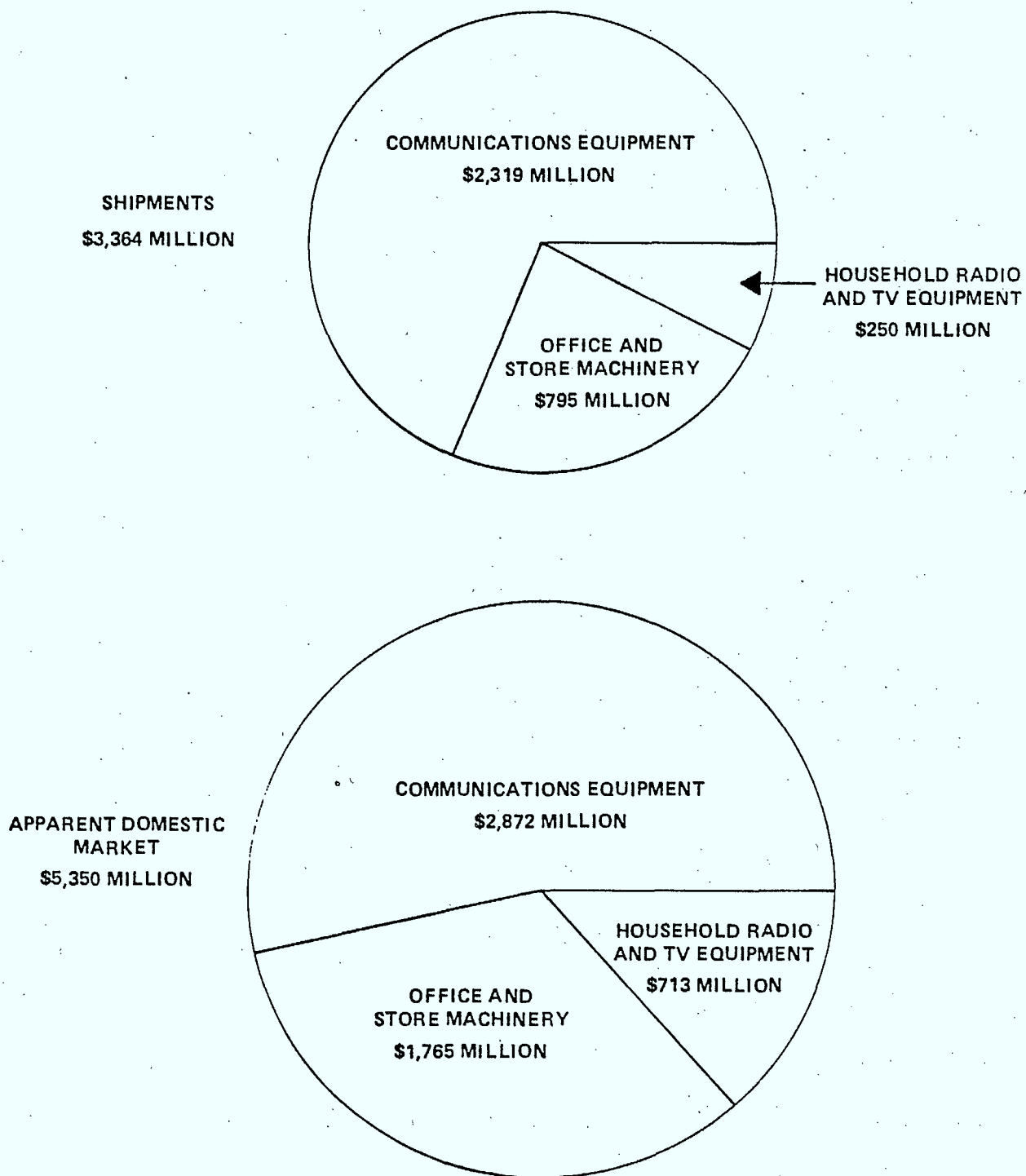
Key Characteristics of Demand

Traditionally, the markets for these four industries were quite different:

- communications equipment was sold largely to regulated common carriers;

* The apparent domestic market calculations are made by the Department of Industry, Trade and Commerce from Statistics Canada data. See "Electrical and Electronic Industries Statistical Summary, 1980".

RELATIVE SIZE OF EQUIPMENT
MANUFACTURING INDUSTRIES
IN CANADA



- EDP and office automation equipment was sold to large and medium sized businesses and governments; and
- electronic consumer goods were sold to households through retail outputs.

However, these distinctions have begun to blur.

Historically, demand for communications equipment was largely from telephone companies and other carriers. Because the buyers were a few very large and powerful companies, they constituted an oligopsony. This situation has changed recently as businesses and households purchase a growing share of the industry's output. The interim interconnect decision has accelerated this change, encouraging greater competition in features as well as price.

Until recently, all terminal equipment was leased to users by the telecommunications carriers. The end user generally did not have any choice other than the limited range of alternatives provided by the carrier. Partly because these leases generally provided for maintenance of the equipment to be done by the carrier, ease of maintenance and durability were key factors in equipment design. Moreover, with rates based on a return on assets, there will tend to be a bias toward quality rather than minimum cost in selecting equipment.

The demand by telephone companies for central office equipment is related largely to the growth in the number of telephones and the extent of usage. However, older types of switching equipment are also being replaced gradually.

Electronic data processing and office automation equipment, on the other hand, are purchased largely by end users. These have generally been large and medium sized businesses interested in improving the processing of information, which is increasingly recognized as one of the key resources of any organization.

In recent years, computerization has spread more and more outside the accounting function, and into smaller businesses. User departments are even acquiring their own small computers, rather than relying on central corporate facilities. Mini and micro computers have played a major role in serving these markets.

Recently, the computer has entered the home market on a significant scale. These computers are used for entertainment and as a hobby, although they could also be used to access electronic information services.

At one time, EDP was thought of as a way of reducing clerical staff. However, it is now recognized that personnel savings are more likely to be through slower growth than any absolute decline. The major benefits of computerization are generally from the availability of more information on a more timely basis. This permits more efficient management of resources, and in some cases, better customer service.

EDP hardware is of no value without both systems and application software. The availability of suitable software can therefore be a major selling point for the hardware itself. For the office automation industry to progress from relatively unsophisticated stand-alone devices to an integrated electronic office will also require substantial software development.

Use of EDP and office automation equipment in business often has a dramatic impact on job content, and the working environment, in addition to its potential impact on the absolute number of jobs. Social and psychological factors will often come into play, with the result being some resistance to the change brought by the new technology. This resistance may slow down the rate of introduction or lead to outright rejection of the new technology for many years. Overcoming this resistance was a major challenge for the EDP industry, and now for office automation.

For the business market, since each client's needs are somewhat different, the ability of a manufacturer to customize, modularize or otherwise fit his product more closely to the needs of a given type of user is a distinct advantage. The reliability of the equipment and the ability of the supplier to offer maintenance and after sales support are also very important factors in the purchase decision. This is due to the relatively high cost of this equipment, its technological complexity and its vital importance to the continued operations of business.

Demand for electronic consumer goods is very much related to changes in lifestyles, demographic patterns and leisure time preferences. Trends in disposable incomes also have an important impact on demand, as they do for all consumer durables. Because consumer electronic equipment is purchased largely for entertainment, rather than to meet some practical need, the novelty of the device itself may be a key factor. This seems to be the case with home computers.

Key Characteristics of Supply

Research and development (R & D) is the most important single ingredient for continued success and growth in the sub-sector. As the pace of technological change - driven by R & D at IBM, Xerox, Western Electric and other industry giants - makes one technology after another obsolete, the equipment manufacturer needs to have new products continuously on the drawing board to remain competitive. It has also been a major area for federal government involvement, both through the Communications Research Centre (CRC) and the National Research Council (NRC).

Although the fast pace of technological change in the industry makes product R & D a critical success factor today, as technology stabilizes, process innovation and the ability to mass produce cheaply and to reap economies of scale is likely to become the key to world leadership. Japanese success on the consumer goods side illustrates this principle.

Operating technology is evolving continuously throughout the sub-sector as a result of technological changes in products and the use of computer-assisted design and manufacturing (CAD/CAM). All industries in this sub-sector are capital intensive, requiring major investments in plant and equipment. They may also be considered "qualified manpower intensive" - given the high technological content of R & D and of some production operations.

Like any high technology industry, the equipment sub-sector is characterized by substantial delays and high capital requirements between the start of the research and development program and market success. Indeed market success is very difficult to predict given that the product may differ radically from these already available and given the constant risk that a competing product will reach the market sooner and prove to be more attractive. The technical feasibility of the innovation, and of large scale production, must also be demonstrated. Business risk and financing problems are therefore substantial, especially for small companies.

Components, particularly "chips", are generally imported from large specialized manufacturers in the U.S. and Japan. However, some Canadian firms such as Northern Telecom and Mitel produce specialized chips for their own needs. The rapidly increasing capability and decreasing cost of chips has been a major factor in the progress of the sub-sector.

The establishment of standards is a critical role in the equipment industry, since different types of equipment must be linked together to form telecommunications or data processing systems. In EDP, IBM has had such a dominant position that it has been able to establish "de facto" standards. In communications equipment, standards have been set largely by the common carriers.

The supply characteristics of the electronics consumer goods industry are quite different from the other industries in the sub-sector in that:

- the industry mass markets its products directly to consumers;

- securing a good distribution network is a key success factor in the industry, and an important barrier to entry;
- the pace of technological change in some segments of this industry has not been as fast as in the other industries of the component. Hence, process innovation and the capacity to reap the benefits of economies of scale are already a key success factor in the industry;
- since products are relatively standardized, tough price competition can be observed; and
- as a result, many manufacturers in the industry are seeking to generate brand differentiation by investing large sums in promotion. The television market is an example of this phenomenon.

The space industry, which in Canada is oriented to a considerable extent toward communications, is a very high technology area. From a business standpoint, a major problem is that individual contracts can be large, but there are few of them. Maintaining a reasonably steady level of activity, and therefore holding together a highly skilled work force, is a critical success factor.

Industrial Organization

The communications and EDP equipment industries are both very concentrated. Northern Telecom dominates communications equipment in Canada, as IBM does in EDP equipment not just in Canada but to a considerable extent around the world. In each of these industries, the ten largest companies in each industry account for roughly 80% of total sales. While the office automation industry is not as homogeneous, it is also dominated by giants like IBM and Xerox. No one dominant firm can be singled out in the electronic consumer goods industry, although Japan as a country now holds a dominant position. This strong tendency to concentration appears to be due to the importance of research and development, and economies of scale in the EDP industry. These have also been historical factors in communications equipment.

There are significant barriers to entry throughout the sub-sector in the form of capital, know how, reputation and the long delay between research and commercial introduction. The vertical integration of Northern Telecom and Bell Canada also tended to be a barrier to entry, though its importance is somewhat diminished by terminal interconnection and Bell's more open attitude to outside suppliers. In the electronic consumer goods industry, the very low price level, the difficulty of securing distribution channels and the existing brand differentiation are additional barriers to entry.

Canadian ownership is relatively high in the communications equipment industry. This came about because anti-trust litigation in the U.S. forced Western Electric to sell its interest in Northern Telecom to Bell Canada. More recently, however, the spectacular growth of a number of small Canadian-owned manufacturers (such as Mitel and Gandalf) has changed the configuration of the industry. In the rest of the sub-sector, Canadian ownership is very small. For instance, only 6% of the revenues generated in the EDP equipment industry flow to Canadian-owned firms. There are, however, some niches in these industries (such as AES in word processors) where Canadian firms have made breakthroughs nationally and internationally.

Government Involvement

By international standards, the involvement of the Canadian government in the conduct of the equipment sub-sector has been limited, although growing. With respect to research and development, the industry is eligible for income tax exemptions like any other. The government itself carries out and funds research through the Communications Research Centre and the National Research Council. Grants are available from the Department of Industry, Trade and Commerce, through the Enterprise Development Program and the Special Electronics Fund. Various forms of direct and indirect assistance have also been provided to Spar Aerospace as a chosen instrument for the development of a Canadian industry in satellite technology. The recent federal budget and announcements with respect to the space program indicate a commitment to continue and extend the government's participation in this subsector.

The government has made relatively few direct investments in the equipment sub-sector. Consolidated Computer is an exception with which the government can hardly be pleased, although NABU has now taken over control of the company. In the case of Electrohome, on the other hand, the guaranteeing of loans played a key role in turning the company around. The Canada Development Corporation is also involved in the equipment sub-sector, for example, through its controlling interest in AES.

The communications equipment industry has been influenced substantially by the regulation of telecommunications. The recent interim decision on terminal interconnect is a conspicuous example. The CRTC is also in a position to control depreciation rates and equipment replacement programs. Even the setting of rates has an indirect impact on demand for equipment to the extent that it influences demand for service.

The tariffs on EDP and other electronic equipment were presumably meant to provide some form of protection to local industry. In addition, the Department of Industry, Trade and Commerce has had a policy of moral suasion on foreign multinationals to balance their total production in Canada with their total sales. This is now expressed in terms of giving a world mandate for some products to the Canadian subsidiary.

While the incentives provided by the Department of Regional Economic Expansion to locate facilities in designated areas are not intended specifically for the equipment sub-sector, they may become a significant source of financing. Recent examples are the grants to Mitel for facilities at Renfrew, Ontario and Buctouche, New Brunswick.

The federal government is also a substantial buyer of telecommunications equipment, particularly for defence purposes. This includes radar and radio communication equipment.

Economic Performance

Canada's trade balance is negative in every industry in the sub-sector, based on Statistics Canada's industrial classification. The deficit for 1980 was as follows:

Communications equipment (including components)	\$552.6 million
Office and store machinery	\$970.0
Household radio and TV equipment	\$462.6

The trends in the trade balance since 1971 are shown in Exhibit 6-2 overleaf. Exhibit 6-3, following, shows the proportion of the apparent domestic market which was supplied by domestic shipments. These exhibits indicate a fairly steady growth in the trade deficit in all three industries, and a corresponding down trend in the share of the domestic market supplied by Canadian production.

However, there are substantial differences within the sub-sector. The communications equipment industry performs best in terms of shipments as a percentage of the apparent domestic market. If one excludes the huge deficit in components trade, the balance of trade in the rest of the communications equipment industry, and particularly in telephone equipment, is positive. This is illustrated in Exhibit 6-4 which follows. The trade balance is strongly and persistently negative in the office and store machinery industry, which corresponds roughly to EDP and office automation equipment. The absolute size of the deficit is compounded by the low technological content of our exports in that field. However, there are individual product lines such as word processing where our performance is more satisfactory. The trade situation is also very weak in electronic consumer goods.

EQUIPMENT SUB-SECTOR

TRADE DEFICIT

1965 - 1980

TRADE DEFICIT
(\$ MILLIONS)

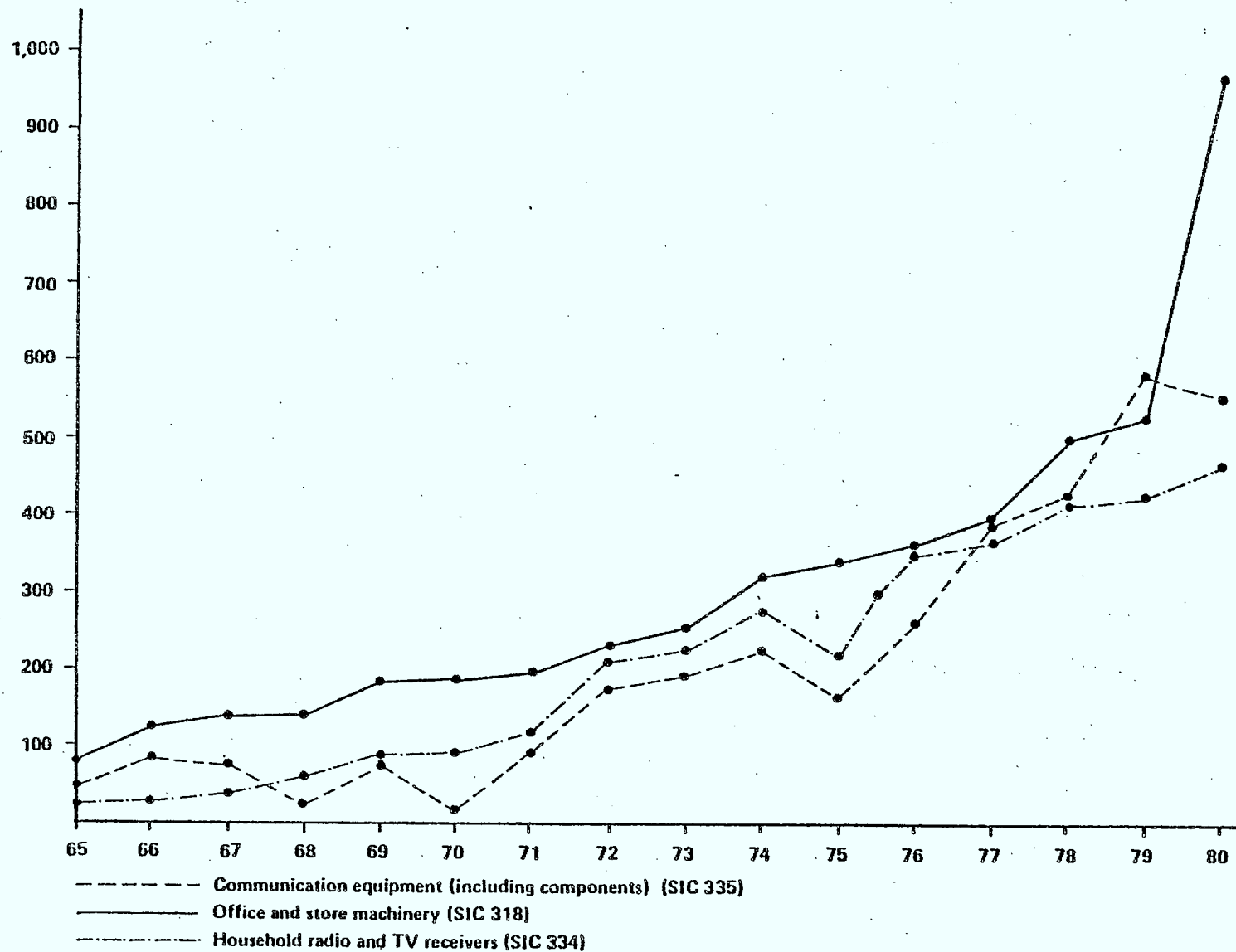
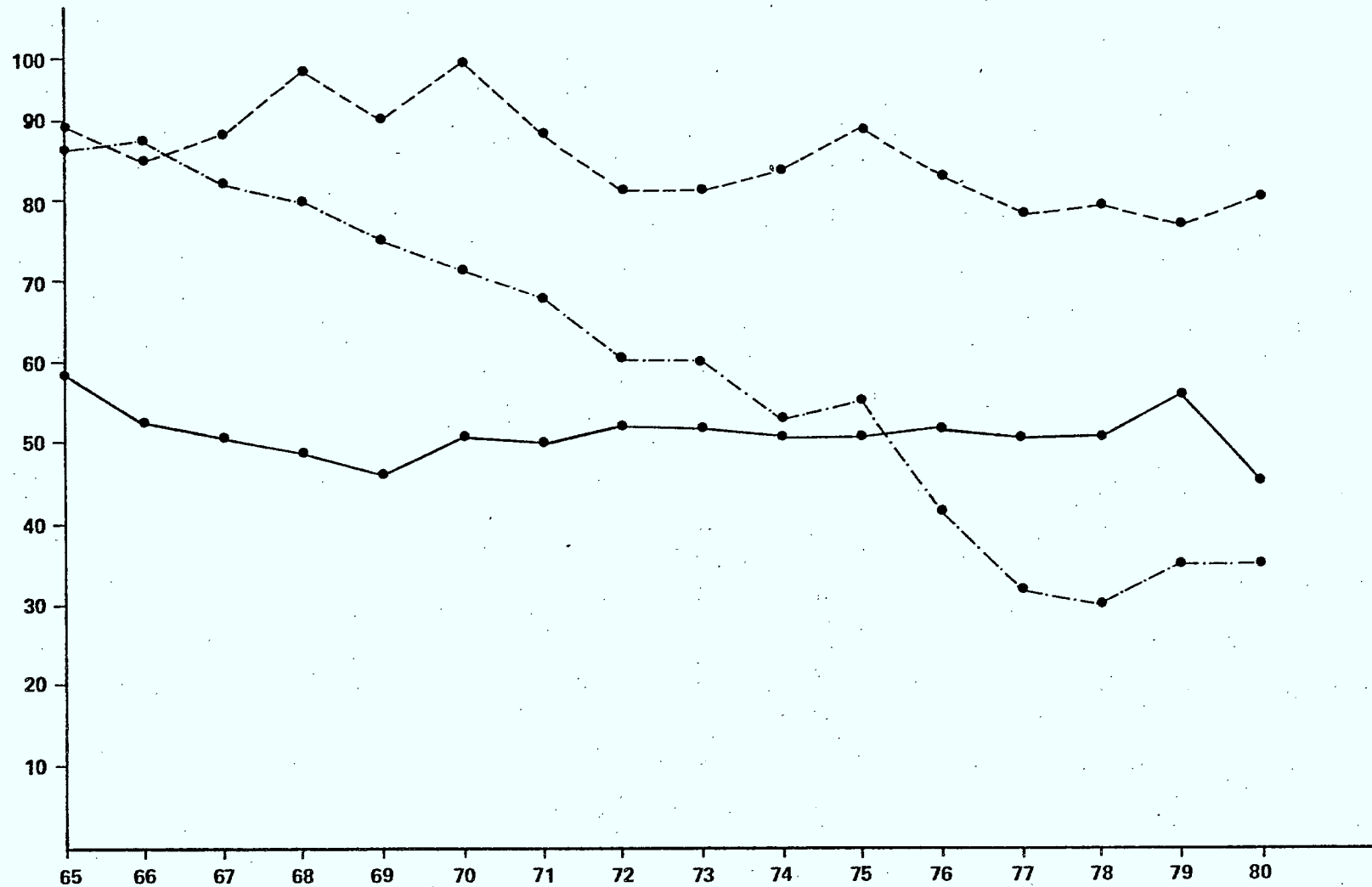


EXHIBIT 6-2

EQUIPMENT SUB-SECTOR
SHIPMENTS AS A PER CENT OF
APPARENT DOMESTIC MARKET

SHIPMENTS
% OF APPARENT
DOMESTIC MARKET



- Communication equipment (including components) (SIC 335)
- Office and store machinery (SIC 318)
- · - Household radio and TV receivers (SIC 334)

Source: *Electrical and electronics industries statistical summary* — 1980 edition, Department of Industry, Trade and Commerce

EXHIBIT 6-3

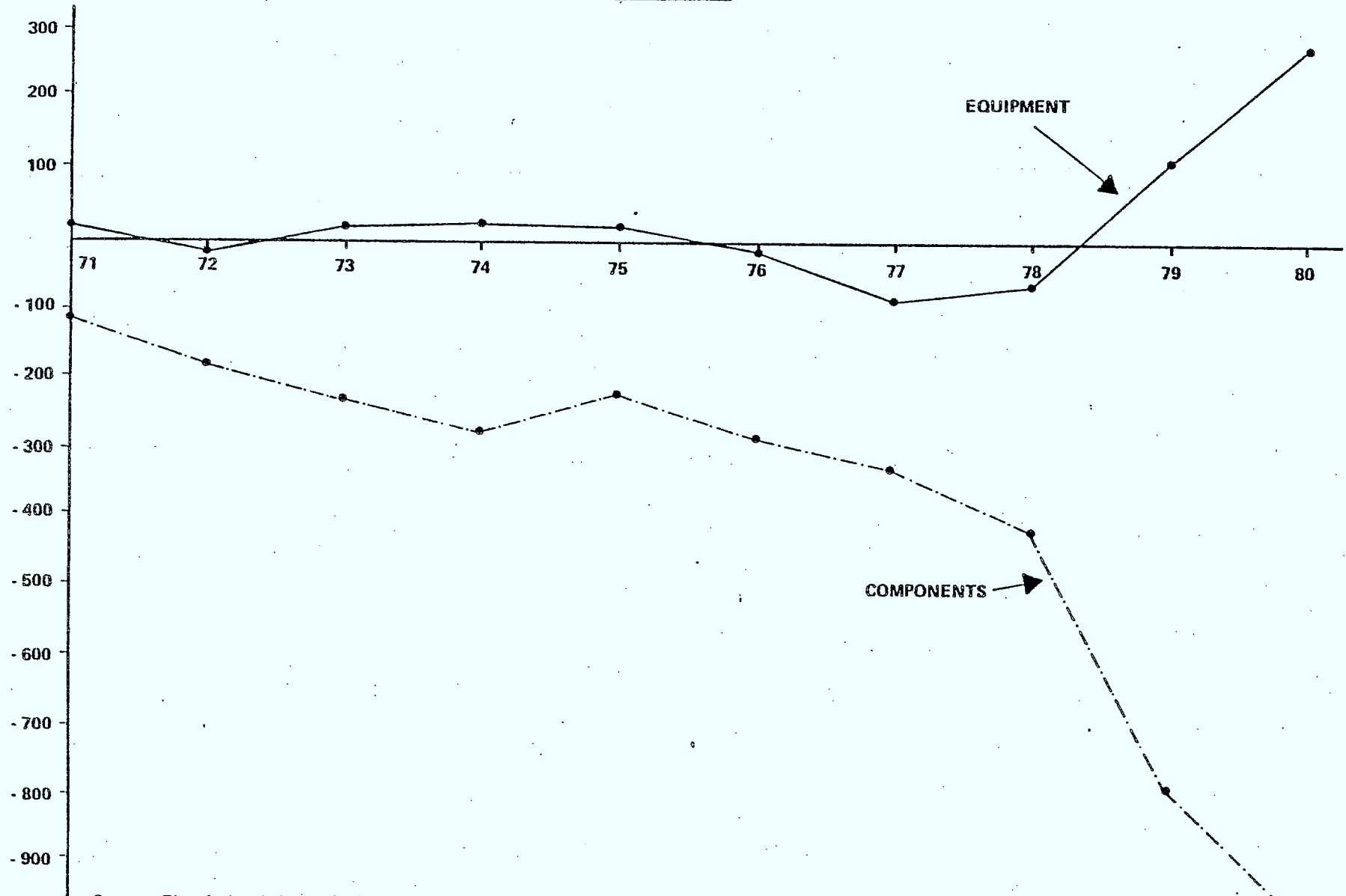
EQUIPMENT SUB-SECTOR

TRADE BALANCE

IN TELECOMMUNICATIONS EQUIPMENT AND COMPONENTS

1971 - 1980

TRADE BALANCE
(\$ MILLIONS)



Source: Electrical and electronics industries statistical summary - 1980 edition, Department of Industry, Trade and Commerce.

Canada's generally poor trade performance in EDP equipment, office automation equipment and electronic consumer goods can be traced to the following factors:

- the generally low level of private sector research and development in Canada, in either products or production processes. This is related to the branch plant structure of the Canadian industry;
- the absence of major government assistance programs in the past, in contrast with the help given by foreign governments, directly or indirectly, to their native sons;
- the relatively small size of the Canadian market by international standards;
- our proximity to the U.S. and the similarity of both markets. This factor can be either a major opportunity for Canadian firms (as it has been in telecommunications equipment) or a serious threat (as in EDP equipment);
- the economics of production in these industries (economies of scale, low transportation costs, rapid changes in products and processes, etc.), which have made tariffs an ineffective instrument for encouraging foreign multinationals to build up manufacturing capability in Canada to any significant extent;
- Canada's late start in manufacturing in product lines such as large computers, and the high barriers to entry that existed by the time Canada might have entered; and
- the relative scarcity of venture capital in Canada, which in the opinion of industry has made it very difficult for new companies to go beyond the research phase into development and commercialization.

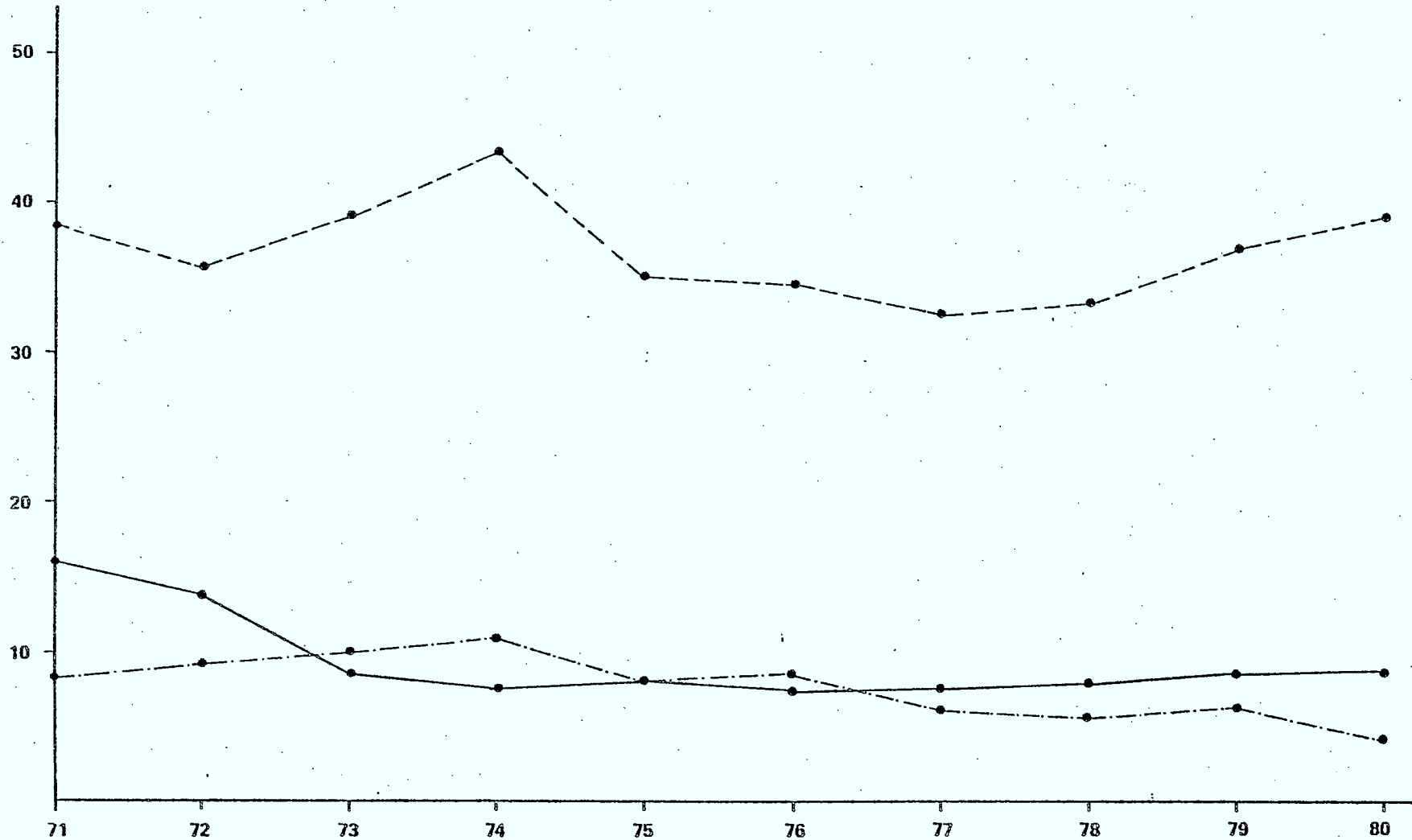
The relatively strong trade performance of the communications equipment industry can be traced to a number of factors:

- the relatively strong and sustained local demand for communications equipment because Canada is a large, sparsely populated country;

EQUIPMENT SUB-SECTOR
AVERAGE NUMBER OF EMPLOYEES IN CANADA

1971 - 1980

NO. OF EMPLOYEES
(THOUSANDS)



- Communication equipment (including components) (SIC 335)
- Offer and store machinery (SIC 318)
- · - · - Household radio and TV receivers (SIC 334)

Source: *Electrical and electronics industries statistical summary — 1980 edition, Department of Industry, Trade and Commerce*

- the vertical integration of Bell Canada and Northern Telecom and of BC Telephone with what is now AEL Microtel, which provided a form of protection for Canadian industry, and a base from which to expand into international markets;
- the severing of the link between Western Electric and Northern Telecom (as a result of U.S. anti-trust litigation), which led to the creation of a major research and development centre, Bell-Northern Research. This later provided the nucleus for the growth of electronics firms in Ottawa;
- the early implementation of new switching technologies developed by Bell-Northern, which gave Canada a head start internationally in the field;
- the opening of some segments of export markets, initially the U.S. non-Bell market and more recently the U.K. market, which has allowed important inroads by Canadian industry abroad; and
- the recent phenomenal growth of a number of small and aggressive specialized manufacturers has given Canadian industry its latest boost. This growth is related partly to the interim terminal interconnect decision.

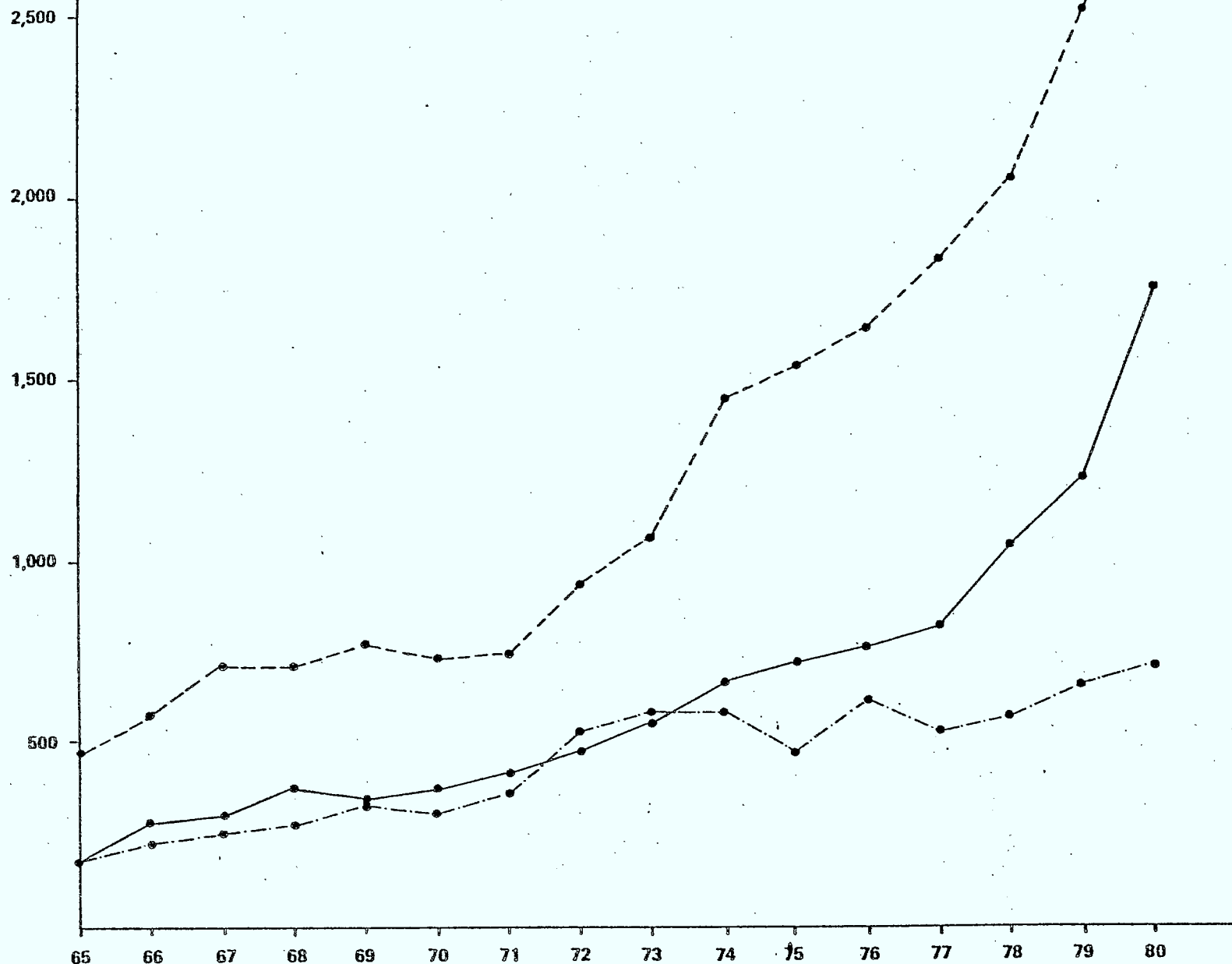
The communications equipment industry provides a very substantial number of jobs in Canada, as shown in Exhibit 6-5 opposite. However, changes in the nature of the equipment and greater mechanization of the production process resulted in a declining trend in employment for some years, despite increases in output. This downtrend appears to have been reversed recently, but the growth is not dramatic. There are relatively few production jobs in Canada in the other parts of the equipment sub-sector - except in some niches such as word processors.

One positive aspect of performance in the equipment sub-sector is that Canadian industry and households in general have generally had access to high quality equipment at reasonably low cost. With respect to EDP and office automation equipment, the impact on the productivity and efficiency of Canadian industry generally and on the standard of living of Canadians has been positive, as in other countries. However, these benefits are attributable more to the availability of imports than to the local equipment industry.

EQUIPMENT SUB-SECTOR

APPARENT DOMESTIC MARKET

APPARENT
DOMESTIC MARKET
(\$ MILLIONS)



- Communication equipment (including components) (SIC 335)
- Office and store machinery (SIC 318)
- · - · - Household radio and TV receivers (SIC 334)

EXHIBIT 6-6

Economic Trends and Key Factors

The apparent domestic market for communications/information equipment has grown at irregular but relatively high rates. Based on figures derived by the Department of Industry, Trade and Commerce from Statistics Canada sources, the growth in the apparent domestic market has averaged 18.5% over the past ten years for office and store machinery, 16.5% for communications equipment (including components) and 8.7% for electronic consumer goods. These growth trends are illustrated in Exhibit 6-6 opposite.

One of the crucial questions for the future of the sub-sector is the price elasticity of demand for its products. Unit costs and prices of many types of equipment, particularly computers, have fallen dramatically over the past three decades. The cost of chips, the basic building block for much of this equipment, is continuing to decline. To date, the declining unit prices have spawned enough additional unit sales, to produce substantial growth in dollar volume. Computers have been applied in smaller and smaller business organizations, and in a greater range of functions. More computers have been sold directly to user departments rather than to the traditional EDP department. This came about partly as a result of disappointment with the service provided by central facilities, and partly because economies of scale in equipment had become less significant. Interactive systems have also become more popular compared to traditional batch processing. However, there is no assurance that this growth in usage can continue to offset declining prices indefinitely.

The distinction between communications, EDP and office automation equipment is becoming blurred through the application of computer technology to all three areas. As a result, companies (often giants) which operated in different industries and never considered each other as competitors are now moving toward each others traditional markets. In other words, Northern Telecom, like Western Electric in the U.S., is beginning to come into competition with companies such as IBM.

There has been a great deal of publicity recently about the "office of the future". This is generally thought to imply not just more sophisticated electronic message and document transmission, and broader use of word processors and computers, but some form of integrated office system. In this system, all the stand alone electronic equipment now found in the office would be working in unison, coordinated by some sort of central processing unit. Sociopsychological factors and lack of software may slow down the automation of the office, but it is generally agreed that the movement in this direction is inexorable, given the increasing cost of office operations. Whether this automation will actually involve integrated systems and multi-purpose terminals is less clear. It will depend in large measure on the capital and operating costs of integrated systems as opposed to simpler, stand-alone devices.

There are also many unanswered questions as to the impact of such systems on industrial organization in the equipment sub-sector. If systems really do become highly integrated, it is likely that users will look for full line suppliers or for system houses, rather than buying elements of their systems from individual manufacturers. What then will become of the small specialized manufacturers of today, which constitute the bulk of the Canadian presence in the industry?

Distribution networks for EDP and communications equipment are also changing as more small businesses and households acquire computers, and telephone users purchase their own terminal equipment. Department stores are entering the market as well as specialized retailers. While those may reach only some segments of the total market, they are growing segments and a strong position in these new channels may be a significant advantage for any company in the industry.

The growth potential of the sub-sector appears to be attracting greater competition. The Japanese are determined to achieve a strong position in EDP and office automation equipment, just as they have come to dominate electronic consumer goods. Many large companies with strong financial resources are also looking at the equipment component as a potential area for diversification. Some major companies, such as Exxon and Volkswagen, have already tried to penetrate the industry, but have encountered problems.

The greatest potential for market growth in percentage terms may lie in under developed countries. This is particularly true for telephone equipment, since growth potential in the developed countries is limited to some extent by the high penetration rates and relatively good quality of the systems already in place.

The interim terminal interconnect decision has made a significant part of the communications equipment industry much more open to competition. Many companies, local and multinational, are rushing to position themselves in this market. If the interconnect decision were to bring about some reciprocity in international markets, it could create major opportunities for Canadian industry. Over the long run, since the industry is selling not only to the regulated carriers but also to end-users, this may have an important effect on the type and quality of products which are sold. Ease of maintenance may no longer be the most important criterion in the design of equipment, with the features and capability of the equipment becoming more significant. Indeed, planned obsolescence may become the rule.

We may also be at the beginning of a major expansion in the household market for communications/information equipment. There has been a proliferation of new products in the area of home telecommunications, video cassette recorders, personal computers, video and other electronic games, educational software, alarm systems and electronically controlled home appliances. Growth in demand for such products is encouraged by increased leisure time in industrialized countries, the rising level of education in the population

and the greater familiarity of the younger generation with computer technology. Interest in home computers as a hobby is likely to remain limited, but there is a possibility that they or Telidon-type terminals will eventually be used for tele-shopping or tele-banking. If these applications ever become widespread, they would create a tremendous demand for suitable equipment.

Policy Issues

The government is faced with some fundamental and very difficult decisions about its role in the equipment sub-sector. It must decide:

- To what extent will it attempt to select the product lines where Canada develops its own technology, those where technology is imported and those where the products themselves are imported?
- To the extent that the federal government does attempt to select product lines in which Canada should specialize, it will have to face such questions as:
 - is it too late for Canada to enter the home computer industry, perhaps through hardware and software related to two-way transactions over cable systems?
 - should Canada abandon any thought of entering EDP equipment manufacturing, and concentrate instead on exporting products and services based on expertise in "how to use" rather than "how to make" computers? This would imply an emphasis on the service bureau, software and electronic information service industries.
 - can a sufficiently continuous flow of satellite and related projects be maintained to establish a solid base for the Canadian space industry?
- At what stage should government concentrate its efforts (e.g. basic research, product development, field trials, process development, production start-up, or marketing)?
- Should assistance be concentrated on struggling new companies, somewhat larger companies with a track record of growth or well-established full-line manufacturers?

- To what extent should Canada attempt to manufacture its own electronic components such as computer "chips"?
- Should government take an active role in promoting mergers, joint ventures or other forms of cooperation among companies?
- Should it encourage faster replacement of existing equipment as new technology makes it obsolete, for example, by allowing accelerated depreciation for income tax purposes?
- Should the tariff and/or the federal sales tax on computers be reduced or eliminated in order to assist Canadian service bureaus and encourage multinationals to locate or retain data processing facilities in Canada?
- Should non-tariff barriers such as standards or limitations on income tax deductions be used to protect some or all of the equipment sub-sector?
- What action, if any, should be taken to encourage compatibility among communications, EDP and office automation equipment produced in Canada?
- Should government procurement be used to influence the extent of manufacturing in Canada or other aspects of the industry? The government is a major user of all types of communications/information equipment, except those intended for the household market.
- Should the federal government attempt, through manpower training programs or pressure on the provincial governments, to increase the output of systems analysts and other computer specialists?
- Can the government develop a long-term plan for the equipment sub-sector which would set out its objectives, the resources available and the criteria to be used in allocating those resources to specific projects?

VII - CONTENT SUB-SECTORDescription1. Activities Included

The sub-sector we have called "content" is very diverse. At its core, there are a variety of firms involved in original production of information or entertainment. This content may take the form of:

- television programs;
- radio programs;
- motion pictures;
- records and audio tapes;
- books;
- magazines;
- newspapers;
- directories, catalogues and other publications;
- computer databanks, including those whose content is primarily textual rather than numeric;
- advertising material, which in principle may be in the form of any of the media.

Related to these original production activities are distribution activities which we call "content-specific". We have used this term to distinguish them from common carrier channels, which in general are accessible to anyone and adapted to a variety of content types. In some cases, content-specific distribution is vertically integrated with original production. Content-specific distribution includes:

- television broadcasting;
- radio broadcasting;
- cinemas and film distribution;
- record stores;
- bookstores;

- . newsstands;
- . newspaper delivery; and
- . libraries.

At the other end of the spectrum are a variety of reproduction and technical service functions related to original production. Those which are commonly carried out by separate firms include:

- . motion picture laboratories and production services;
- . sound recording studios;
- . record and tape manufacturing;
- . printing; and
- . platemaking, typesetting and trade bindery.

Given the tremendous diversity of the sub-sector, it has not been possible to cover all areas in equal depth. We have concentrated on original production, which is the most critical in terms of trade, since distribution activities naturally tend to be located close to the market and reproduction and technical service activities will tend to be located close to original production. The area of original production is also that of greatest interest from a cultural policy standpoint, although such concerns are outside the scope of our study.

2. Size of Sub-sector

Because of problems with the availability and comparability of statistics, we have not attempted to quantify the total employment or output of the sub-sector. However, the figures in Exhibit 7-1 overleaf give some idea of the relative order of magnitude of its component industries. It is apparent that the print media account for a substantially larger volume of economic activity in Canada than broadcasting and cinema, although there are some problems of comparability in the data.

EXHIBIT 7-1

CONTENT SUB-SECTOR
RELATIVE SIZE OF CERTAIN INDUSTRIES

<u>Broadcasting and Cinema</u>	<u>Operating Revenue</u>	<u>Full-time or equivalent Employees</u>
Radio (Private Stations)	356.2	9,069
Television (Private Stations)	472.5	6,365
CBC Radio and Television	629.7*	12,241
Cinemas	277.5	7,279
Film Distributors	212.4	729
Film and Videotape Production	139.6	2,165**
Motion Picture Labs. and Prod. Services	35.1	696**
		<u>38,544</u>
<u>Print</u>		
Publishing Only	730.9	10,128
Printing and Publishing	1,496.0	36,350
Printing Only	2,225.4	48,093
Platemaking, Typesetting and Trade Bindery	269.2	7,839
		<u>102,410</u>
<u>Sound Recording</u>		
Sound Recording	350.0	3,500

Sources: Statistics Canada 36-203, 56-204, 63-206 and 63-207 and Department of Industry, Trade and Commerce sector profile of the sound recordings industry. Note that operating revenues cannot be totalled since certain industries are suppliers to others within the sub-sector. Figures are for 1979.

Notes:

* includes net cost of CBC operations paid from general government revenue.

** includes all paid employees except freelancers.

3. Classification of Activities

In the course of our work, we have experimented with various ways of classifying both content and carriage services. Exhibit 7-2 overleaf shows one classification of media formats. It serves to illustrate the variety of means by which a given type of signal can be transmitted, as well as the variety of types of signal which can be transmitted by similar means. Content services can also be classified along such dimensions as:

- frequency of delivery or access, for example continuous, hourly, daily, weekly, quarterly, annual or occasional;
- timeliness, which is related to frequency but not identical. It reflects delays in the process of production and delivery. Tolerances in terms of timeliness are generally greater for lower frequencies; and
- audience type, for example business or household, and breadth, for example mass or special interest.

Key characteristics of demand

Consuming content is clearly one of the major leisure time activities of Canadians, but there are difficulties in obtaining accurate data on the subject. Exhibit 7-3, following, shows some of the results of a 1976 Statistics Canada survey on participation in leisure activities.

It indicates that television watching is by far the most popular activity, both in terms of the number of people participating and the number of hours each of them devote to the activity. However, the dominance of television may be even greater than those figures would indicate, since there are indications that people tend to overstate their participation in prestige activities such as reading, and understate such activities as television watching.

MEDIA FORMATS

	WORDS	MUSIC	NUMBERS	PICTURES
LIVE PERFORMANCE	<ul style="list-style-type: none">Speech	<ul style="list-style-type: none">Concert	<ul style="list-style-type: none">Bingo	<ul style="list-style-type: none">Play
HARD COPY	<ul style="list-style-type: none">NewspapersMagazines	<ul style="list-style-type: none">Sheet Music	<ul style="list-style-type: none">Computer OutputsTables	<ul style="list-style-type: none">Still PhotosBillboards
ELECTROMAGNETIC WAVES	<ul style="list-style-type: none">Radio BroadcastsVoice Transmission Via Microwave or SatelliteTwo-way Radio	<ul style="list-style-type: none">Radio Broadcasts	<ul style="list-style-type: none">Data Transmission Via Microwave or Satellite	<ul style="list-style-type: none">Television Broadcasts
WIRES	<ul style="list-style-type: none">Telephone CallsTelexVideotex	<ul style="list-style-type: none">FM Radio Via Cable	<ul style="list-style-type: none">Data Transmission	<ul style="list-style-type: none">Cable TV
STORAGE MEDIA	<ul style="list-style-type: none">MicrofilmWord Processing DiskettesAudio Tapes	<ul style="list-style-type: none">RecordsAudio Tapes	<ul style="list-style-type: none">Computer TapesComputer Discs	<ul style="list-style-type: none">Video CassettesVideo Discs

FREQUENCY OF PARTICIPATION

IN CERTAIN LEISURE ACTIVITIES

LEISURE ACTIVITY	% of Total population 14 and over participating during month	Number of hours during a typical week during the last month for those who participated.				
		Less than 3 hours	3-7 hours	8-14 hours	15-29 hours	30 or more hours
Watching television.....	90.0%	17.7%	27.4%	25.6%	18.5%	10.2%
Listening to the radio.....	80.2	32.4	30.1	18.2	10.1	8.7
Reading newspapers, magazines for leisure..	72.9	51.5	34.3	10.0	2.4	1.0
Reading books for leisure.....	54.0	40.0	34.4	16.9	5.7	2.5
Listening to records, tapes or cassettes....	53.7	49.5	29.3	12.3	5.1	3.2
Number of times within last month						
		1	2	3	4	5 or more
Attended a movie or other film.....	31.0%	46.9	27.8	12.8	6.2	6.1
Attended a sports event as a spectator.....	21.0	32.9	25.3	15.4	9.0	17.2
Attended a class.....	17.5	8.6	8.4	7.8	19.0	56.1
Visited a craft fair, festival, circus, zoo, or exhibition.....	16.2	67.8	20.1	6.7	2.5	2.4
Visited a cultural centre.....	16.1	43.7	25.3	10.6	6.7	12.1
Attended a musical performance or recital..	10.4	66.1	20.6	7.1	2.3	3.3
Attended a live theatre production, a ballet or other dance performance.....	6.8	70.6	17.1	6.3	2.3	3.0

Percentages for each activity are based on those respondents who indicated definitely that they participated in that activity. Non-participants in that activity and non-respondents to the question are both excluded. Statistics Canada advises that figures should be viewed with caution.

Some other figures on consumption of content are as follows:

- Canadians watch an average of 23 hours of television a week, according to conventional audience measurement techniques;*
- total daily circulation of newspapers was 5.4 million in 1980, or one newspaper for every 3.3 people living in urban areas;**
- total reported circulation of consumer magazines was 44.2 million copies for the year 1978;***
- paid admissions to motion picture theatres totalled 98 million in 1979. In other words, each Canadian attends roughly 4.3 movies per year;****
- a total of 84.6 million Canadian-made records and tapes were sold in 1980, or roughly 3.7 records or tapes per capita.*****

While the various content media compete with each other for consumer and advertiser dollars, they are by no means perfect substitutes. The print media have advantages because they are:

- portable;
- well adapted to conveying detailed, factual material;
- organized so that the reader can select the content of greatest interest and the level of detail he wants;
- in hard copy, so that the reader can refer back to specific facts or provide copies to others; and
- available at the reader's convenience, once published, rather than having to be watched at a specific time.

* From an internal CBC research report based on a variety of public sources covering the 1979-80 season. This figure is substantially higher than that reported by Statistics Canada. The difference may be due in part to bias in the responses, but there are also differences in definition.

** Royal Commission on Newspapers, based on Statistics Canada data.

*** Statistics Canada Catalogue 87-625, 1978.

**** Statistics Canada Catalogue 63-207, 1979.

***** Statistics Canada Catalogue 47-004, December 1980.

Other media such as television, radio and the cinema appeal more directly to the senses, which makes them powerful advertising media. However, they are not as well suited as text for conveying factual information, and therefore for types of advertising where details of prices or product availability are important.

The various media have established very different markets in demographic terms. Television is watched by almost everyone, but there are substantial variations in viewing time depending on:*

- sex, in that women, particularly those without paid jobs, watch substantially more than men;
- age, with those over 60 watching substantially more and those 18-24 substantially less than average. Contrary to what one might expect, children watch fewer hours of television than adults;
- education, with adults with no high school watching over 30 hours per week compared to 16 hours for those who completed university; and
- mother tongue, with francophones watching more than other Canadians.

The print media, on the other hand, tend to appeal to those with more education. A Statistics Canada survey in 1978 indicated that 73% of those with post-secondary schooling read magazines, compared to 53% of those without. For newspaper reading, the figures were 91% and 80%. Participation patterns by age are less clear, but magazine reading tends to be highest among younger adults who do not yet have children, and newspaper reading among the middle-aged.**

* Based on an internal CBC research report which analyzes publicly available data for the 1979-80 season, except for the observation on mother tongue, which is based on Statistics Canada Catalogue 87-630, 1978.

** Statistics Canada Catalogue, 87-625, 1978.

Younger adults, particularly those under 25, are much more likely to attend movies or listen to records and tapes than their elders. A 1978 Statistics Canada survey showed that 59.7% of Canadians had listened to records in a particular week, but the percentage was 90.2% for those 15-16 years old, 86.8% for those 17-19 and 79.1% for those 20-24.* Figures published by Statistics Canada in January 1973 indicated that 38% of Canadians paid to attend movies, but the percentage was 58% for those 15-16 years old, 65% for those 17-19 and 63% for those 20-24.**

While households are the major market for content, business demand is far from negligible:

- the business press accounted for 19% of the total reported circulation of periodicals in Canada in 1975, and 40% of the advertising revenue;***
- sales of public electronic information services are now in the order of \$25-40 million in Canada****, and this demand is presumed to come largely from business; and
- sales to industry accounted for 19.3%, and sales to advertising agencies for 40.3%, of the operating revenue of film and videotape producers in Canada in 1979. This represented over \$60 million in sales.*****

* Statistics Canada Catalogue 87-615, 1978.

** Quoted in "The Film Industry in Canada", a report prepared by the Bureau of Management Consulting for the Arts and Culture Branch, and published in 1977.

*** Statistics Canada 87-625, 1978, based on data from the Maclean-Hunter Research Bureau.

**** Estimates supplied by Department of Communications based on a variety of studies.

***** Calculated from data in Statistics Canada 63-206.

Demand tends to be differentiated by language, but French-speaking Canadians consume a substantial amount of English-language content, either in translation or in the original language. For example:

- . 19% of TV viewing by francophones is of English channels;*
- . 55% of the records sold in Quebec in 1975 were in English**; and
- . 21.2% of new French-language books published in Canada in 1976 were translations.***

Business markets may tend to be less differentiated by language, since they are concerned with information rather than entertainment, and proficiency in English is widespread in the business community.

Canadian tastes in English-language entertainment do not appear to differ substantially from those of Americans. This is reflected in the predominance of imported content, on which figures are provided later in the report. However, there is a demand for certain types of content, primarily of an informational nature, which are local or national.

Many areas of the content sub-sector are characterized by a continual stream of new mass-market items. This applies, for example, to records, books and motion pictures. The demand for these individual items is difficult to forecast because it is influenced by factors such as changes in consumer tastes, perceptions of product quality and the impact of marketing efforts. From the consumer's standpoint, it is difficult to select from among all these entertainment alternatives. The result is the emergence of "big name" actors, authors, recording artists, and to some extent directors, whose reputation helps to boost sales, and who can therefore command spectacular incomes.

* From an interest CBC research study of the 1979-80 season.

** Statistics quoted in an internal Arts and Culture Branch report, based on figures gathered by the Québec Ministry of Cultural Affairs.

*** Calculated from figures in Statistics Canada 87-602, 1976.

Key characteristics of supply

The production process is, of course, very different for different types of content. One widespread characteristic, however, is that development and set-up costs tend to be high relative to marginal costs for reproduction and shipment. This is particularly true for film and videotape, where additional copies can be produced at low cost, and each copy can be used many times. However, even in the print media and sound recording, where the product is bulkier and more material-intensive, editorial and production set-up costs are substantial. This cost structure encourages content producers to seek the broadest possible market. Apart from the language barrier, this will tend to be a world market.

Another key characteristic is that costs often cannot be recovered directly from users. In radio and television broadcasting, the reasons were originally technical. For newspapers and magazines, the reasons are economic, with subscribers simply not being prepared to pay the full cost. Daily newspapers, for example, receive four times as much revenue from advertising as from subscriptions. On the other hand, the consumers of records, movies and books have traditionally paid the whole amount, which is presumably one factor contributing to lower participation in these activities.

Since the consumer has not paid directly for television programs in the past, he has had no reason to accept a less appealing product in exchange for a lower price. Pay television will obviously change this. In the absence of regulations to the contrary, pay television could well move toward a situation where some channels (or programs) are financed completely by the viewers, others completely by advertisers, others by governments and some by two or more sources.

The capacity of distribution channels for content has traditionally been regarded as limited. In broadcasting, the constraints were technical, and are being overcome through cable television, converters, video cassette recorders as a method of breaking down schedule constraints, and substitutes such as prerecorded videocassettes and videodiscs. For cinemas, bookstores, newsstands and record stores, the capacity constraints are basically economic. Costs for real estate, particularly in prime locations, and for carrying inventory are such that only a limited number of items can be offered to the consumer at one time.

Since the distributor is risk-averse, he will choose to handle movies, books, magazines or records which seem relatively certain to sell quickly. And because Canadian products are less well known, and have often not succeeded commercially, the distributor will tend to shy away from them. It also seems reasonable that he will tend to follow the lead of his counterparts in the United States in deciding what to handle, since the same products tend to do well in both markets.

If distributors of content generally behave as we have suggested, they are no different from distributors of any other product. The reluctance which they have tended to display about handling or giving prominence to Canadian content is probably in large measure a matter of risk aversion and profit seeking, rather than an insidious conspiracy. This implies that effective marketing of Canadian content requires that distributors (and advertisers) be persuaded that it can be profitable for them, as well as consumers being persuaded that they want it.

All of the key characteristics of supply listed above - low reproduction costs, reliance on advertising revenues and limited distribution capacity - encourage an emphasis on production for the mass market. In television broadcasting, the number of channels has been so limited that the private stations have made little attempt at market segmentation. However, they have responded to differences in the demographic composition of the audience at different times of the day.

In radio, on the other hand, there have been more stations and commercial imperatives as well as regulatory requirements have led private operators to orient themselves to different musical tastes, and hence, different demographic groups. However, these groups must obviously be of a certain minimum size and level of interest to advertisers.

Many newspapers, enjoying monopoly status in their communities, now attempt to cater to a broad public. However, in centres such as Toronto and francophone Montréal, which are large enough to support two or more dailies, the smaller papers have adopted a strategy of market segmentation. In most cases, this means a tabloid format as opposed to the traditional "family" newspaper. In the case of the Globe and Mail and Le Devoir, it means aiming at the more sophisticated reader, and reaching out beyond the local market.

Magazines, having lost their mass public to television, have now found their vocation in catering to more specialized audiences.

In other forms of content, such as books, records and motion pictures, the operator of the distribution channel does not have to commit himself to a particular target group on a permanent basis, but each individual item will certainly be directed to a particular audience. Markets certainly exist for minority-interest material, such as classical music recordings, but the large production and promotion budgets will still be concentrated on items with mass appeal.

Debt financing will tend to be difficult for those forms of content where demand is relatively uncertain and development costs are high - books, records, television programs and especially feature films. The availability of equity financing is therefore critical to the success of these industries.

The most critical factor of production appears to be experienced creative people. However, to the extent that production tends to be organized in distinct projects, rather than on a continuous basis, such people will be

difficult to retain unless there are a variety of producers operating on a fairly sustained basis in the same area. The most successful performers will therefore tend to migrate to major centres where they are more likely to command not only steady employment, but also premium incomes.

Industrial organization

The newspaper publishing, magazine publishing, private television broadcasting and private radio broadcasting industries are largely in the hands of Canadian firms because of restrictions on foreign ownership through the Income Tax Act and the Broadcasting Act. As Exhibit 7-4 overleaf illustrates, there are a number of multi-media companies which play a major role in several of these industries. Some of these are also involved in other aspects of the media such as bookstores, book publishing, feature films, cable television, record production and electronic information services, and a number of them are connected with pay television applicants. Nor are these companies necessarily confined to the content industries. The Thomson family has extensive retailing and petroleum industries, Standard Broadcasting is controlled by Argus, and both Power Corporation and the Irving family have newspaper interests.

Multi-media companies have come into existence partly because newspaper publishing is a mature but, in many cases, quite profitable business. The owners have therefore had cash available to invest in other newspapers, in related businesses such as broadcasting, which has itself been highly profitable, or in unrelated business. Moreover, to the extent that media such as newspapers, broadcasting and electronic information services are in competition for the same markets, a company may wish to hedge its bets by being involved in all of them. It would be beyond the scope of this study to speculate on whether the interest of conglomerates in media ownership is due solely to the opportunities for direct profit.

In other parts of the sector such as sound recording, magazine distribution, cinemas and book publishing, preferred access to imported material clearly contributes to success, as the following figures show:

EXHIBIT 7-4RANGE OF FINANCIAL INTERESTS OF SOME MAJOR
CANADIAN COMMUNICATIONS/INFORMATION COMPANIES*

1. Baton Broadcasting - television and radio broadcasting, program production (through Glen-Warren), printing and business forms (through C.F. Haughton and ABF), and master antenna systems;
2. Bell Canada - telephone service in Ontario, Québec and through affiliates in the Atlantic Provinces, telecommunications equipment (through Northern Telecom), telecommunications research (through Bell-Northern and B-N Software Research), electronic office systems (through Data 100 and Sycor in the U.S.), directory publishing (through Tele-Direct), printing (through RonaldsFederated), consulting (through Bell Canada-International), satellite communications (through its minority interest in Telesat), and electronic information services (through the page creation operations of TeleDirect);
3. Maclean-Hunter - 75 business and professional publications, The Financial Post, consumer magazines (including Chatelaine and Maclean's as well as special interest magazines), conferences, business directory publishing, computerized financial information (The Financial Post Investment Databank), commercial printing (including catalogues), radio and television broadcasting (through CFCN Communications and Key Radio), cable television in Canada and the U.S., business forms, paging, two-way radio, telephone answering, trade shows, book wholesaling, press clippings, leasing of circulation lists, market surveys, telephone marketing and microfilm services;
4. Rogers Cablesystems - cable systems in Canada and the U.S., pay television in the U.S. and Canadian hotels, and on-line data processing;
5. Southam - daily newspapers; trade magazines, bookstores (through Coles); electronic information services (through Infomart); radio and television broadcasting (through Selkirk Communications), cable (through Selkirk subsidiaries), sound recording (through Quality Records), two-way cable equipment (through TOCOM), and broadcast news services;
6. Standard Broadcasting - radio and television broadcasting, music publishing, television program production, broadcast news service, recording studios, cablevision systems, and marketing of sound equipment;
7. Thomson Newspapers - 44 daily newspapers and 12 weekly, bi-weekly and tri-weekly newspapers in Canada, plus 67 daily and 5 weekly newspapers in the United States. The Thomson family also has extensive interests in broadcasting and book publishing, largely outside Canada, and in retailing and petroleum;
8. Torstar Corporation - daily newspaper (Toronto Star), weekly newspapers (through Metrospan and Inland), commercial printing, book publishing (Harlequin), magazines (Homemaker's, Madame au Foyer, Quest, City Woman and The Canadian), electronic information services (Infomart) and program production (Nielsen-Ferns).

* Information obtained from the Financial Post Corporation Service in most cases.

- 77.7% of record and tape sales were accounted for by foreign-controlled companies in 1978, and 89.3% of related revenues. Only 5.1% of the record and tape sales of these foreign-controlled companies were from masters produced in Canada;*
- 57.4% of the net book sales of the Canadian publishing industry were by foreign-controlled firms.** The percentage would be even higher if one included companies which do no publishing in Canada; and
- Famous Players, an American-owned firm which accounts for 44% of gross revenues in the motion picture theatre industry, is said by some industry sources to enjoy preferential access to first runs of films produced and distributed by Paramount Pictures, Warner Bros., and United Artists.

The public sector is also a major factor in the content industry. The federal government is represented by the CBC and the National Film Board, and the provinces of Ontario, Québec and Alberta each have educational television services.

Barriers to entry are high in broadcasting because a licence is required, and few new ones are awarded. They are also relatively high in daily newspaper publishing, because of the capital investment necessary, and the preference of retail advertisers for the largest-circulation dailies. In other fields such as sound recording, book publishing, weekly newspapers and feature film production, entry on a small scale is relatively easy because many aspects of production can be contracted out, minimizing capital requirements. Moreover, interest in establishing small firms appears to be high because of the individualism of many creative people, and the prospect of very high returns if a particular product really succeeds.

* Statistics Canada 87-615, 1978

** Calculated from Statistics Canada 87-601, 1978

On the other hand, small firms tend to be at a disadvantage because of:

- a limited product line which leads to higher risks;
- the difficulty of sustaining a major marketing effort, particularly in export markets, without an established reputation and a substantial product line;
- undercapitalization; and
- lack of management expertise, which is a problem common to smaller businesses in all industries.

The result is that many small firms, teetering on the edge of either closure or dramatic success, tend to co-exist with large, well-established firms with better and more reliable profit margins.

Government Involvement

Governments, particularly the federal government, are deeply involved in many aspects of the content sub-sector. However, the objectives of existing government policies appear to be largely social (such as improving accessibility to programs or publications) or cultural (promoting publication of Canadian authors or production of programs with Canadian content), rather than primarily economic.

One thrust of government policy has been to ensure that the public has access to content, particularly of Canadian origin. This objective has been pursued in part through the Broadcasting Act and the regulatory activities of the CRTC. In this connection:

- minimum Canadian content requirements have been established for television programming and music on AM radio;
- cable television companies are required, in most instances, to give priority to Canadian channels;

- cable television companies are required to provide channels and production facilities for community programming; and
- private broadcasters are required to be CBC affiliates where no CBC-owned station exists.

The federal government has also sought to ensure access to content, including imported content in some instances, by:

- providing special funds to the CBC to expand its coverage of smaller communities;
- supporting the distribution operations of the National Film Board;
- subsidizing postal rates for publications;
- exempting publishers from federal sales tax; and
- allowing foreign publications to enter Canada duty-free.

The provincial and local funding of public, school and university libraries also improves public access to content, as did the Half-Back program in Ontario.

A second thrust of government policy has been to increase or protect the availability of funds for production in Canada. The CRTC has pursued this objective by:

- limiting the number of broadcast licences;
- requiring cable companies to substitute Canadian for U.S. stations when the same program is broadcast simultaneously on both; and
- delaying, until recently, the introduction of pay television in Canada.

Other government measures to ensure the availability of funds for content production include:

- funding production for the CBC, largely on an in-house basis, although purchases from independent producers are expected to increase. This production exceeds the minimum number of hours required to meet licensing requirements;
- funding production by the National Film Board, including films sponsored by departments;
- creating and financing the Canadian Film Development Corporation, which makes equity investments in and provides interim financing for feature films;
- allowing a 100% capital cost allowance in the first year for investments in eligible Canadian film and videotape productions;
- not allowing the deduction for income tax purposes of expenditures for advertising in periodicals classified as non-Canadian or on U.S. television stations; and
- providing grants to book publishers through the Canadian Book Publishing Development Program and the Canada Council.

Provincial governments provide funds for programming through the educational television systems in Ontario, Québec and Alberta. They are also major customers for book publishers, through their funding of elementary and secondary schools and of public libraries. Together, these institutions accounted for 27.0% of English language publishers' domestic sales in 1978.*

* Statistics Canada Catalogue 87-601. Comparable figures for French language publishers are not available because of a Québec government requirement that school boards buy through retailers.

Government involvement with content also reflects various other preoccupations. For example, the CRTC is concerned with such matters as the ownership of broadcasters, the amount of time devoted to advertising, and bias in political coverage. The CBC has devoted special efforts to French-language programming outside Québec and programming for native peoples. The federal and provincial governments are also involved in ensuring that content does not violate various community sensibilities, particularly in sexual matters.

It is not our role to evaluate the effectiveness of these existing programs. However, one conclusion that tends to emerge is that programs which rely solely on ensuring the availability of funds for production, without clear commitments as to the use of those funds, cannot be relied upon to provide value for money. This appears true both of the accelerated capital cost allowance, which led to the making of many films that have not proved viable commercially, and of measures to protect the revenues of private television stations, which have not achieved any more than minimum compliance with Canadian content regulations.

In financial terms, paying the CBC's deficit is by far the largest government expenditure in the content sub-sector. It is expected to amount to \$582 million in 1981-82. Next largest are the federal sales tax exemption for publishers, which is said to cost in the order of \$200-300 million annually, and the \$190 million to be paid to Canada Post in 1981-82 for the excess of cost allocated to publication mailings over revenues. The National Film Board's deficit of \$45 million is also a substantial item, but the cost of other tax and expenditure measures such as the 100% CCA for film and video productions, the Canadian Film Development Corporation and the Canadian Book Publishing Development Program is relatively modest. Certain controls on the private sector, such as Canadian content requirements for private broadcasters and the nondeductibility of advertising expenditures in U.S. publications, involve no significant direct cost to the government.

It should also be noted that there are substantial areas of the sector where governments are not involved. Direct regulation or support of newspapers has traditionally been avoided, although some indirect support exists through the sales tax exemption and favourable postal rates. Canadian content quotas do not exist for cinemas, which are under provincial jurisdiction, nor for that matter for bookstores, record stores or newsstands. There is also no direct encouragement of sound recording in Canada, although tariffs and Canadian content regulations on AM radio both have an influence. The absence of tariff barriers for most forms of content is also a significant factor.

Performance

We have chosen two criteria to measure the economic performance of the communications/information sector generally:

- the balance of trade; and
- the price and quality of the products and services available.

With respect to trade, the performance of the content sub-sector is very weak. The best that can be said is that it operates under difficult circumstances. There is also some possible cause for concern about the price and quality of products and services.

1. Imports

Imported content dominates most media, particularly in the English language. Imports account for:

- 72% of revenue from book sales, or 84% if one includes books by foreign authors published in Canada and adaptations;*

* Statistics Canada Catalogue 87-601.

- 73% of periodical circulation revenues.* In terms of number of copies, however, Canadian periodicals dominate. The difference is accounted for by the lower prices of Canadian periodicals and the inclusion of free circulation magazines;
- 74% of English language television viewing, and 38% of French language viewing. For English language programming other than news, sports, and public affairs, the figure is close to 90%**;
- a maximum of 70% of music on AM radio, because of CRTC regulations;
- 80% of public electronic information service revenues;***
- 97% of film distribution revenues in 1979****; and
- 92% of all record albums and 84% of all singles with sales of \$10 million or more in 1978, even based on the CRTC's relatively broad definition of Canadian content.***** Note that records are generally manufactured in Canada, but using imported content. Indeed, the statistics cited refer only to those manufactured here, and would be even higher if imports of finished products were included.

In some of these industries, the impact on Canada's trade deficit is reduced by special factors. Television programs, for example, are imported at prices so far below their original production cost that the trade deficit is less than \$50 million. Sound recordings, although their content may be American, are generally manufactured in Canada due to tariffs and transportation costs. In fact, in dollar terms, three-quarters of the deficit identified is in publishing.

* Statistics Canada Catalogue 87-625.

** From an internal CBC research report on public sources for the 1979-80 season.

*** Estimate provided by the National Library.

**** Statistics Canada 63-207, 1979.

***** Statistics Canada 87-645, 1978.

The consistency of import domination across so much of the content sub-sector indicates that it is neither a historical accident nor a simple conspiracy. Our analysis of key demand and supply factors suggest that imports enjoy some inherent advantages:

- a cost which is significantly lower than for comparable items produced solely for the Canadian market, because development and set-up costs are amortized over a much larger market. In extreme cases, imports may be priced at marginal cost, which can be very low;
- the fact that Canadian tastes in entertainment, particularly in English, are similar to those in other countries such as the U.S. and U.K. One might add that Canadians have a positive interest in the outside world;
- internationally known actors, authors and recording artists, who confer a marketing advantage; and
- risk-aversion by distributors and advertisers, who are likely to regard the commercial success of Canadian content as less certain than that of imported content.

To this list, we might add the spill-over effect of marketing and promotion activities in the United States via media such as television and magazines, and the absence of tariff protection.

2. Inherently Local Activities

There are, however, some significant aspects of the content sub-sector which are inherently local, and where imports are much lower:

- newspapers, because of the importance of timeliness, transportation costs, and the preference of most readers for local and regional news. Moreover, retail and classified advertising, which are well suited to the print media because of their relatively high factual content, are addressed primarily to local and regional markets. The publication of the Globe and Mail by satellite represents an interesting attempt to reach a specialized audience whose interests are more national than local;

- news, sports and public affairs programming on television. Canada's success in this area can be attributed partly to audience interest in events of a relatively local nature. Moreover, production costs for such programs tend to be relatively low*, so that Canadian networks are in a relatively good position to compete with their American counterparts on the basis of quality. Canadian news, public affairs and sports attract close to 80% of the audience for such programming in Canada in English.**
- the actual broadcasting of television programs, because of physical limitations on the range of signals, even with community antenna systems. For the 1979-80 season, U.S. stations accounted for only 29% of all viewing of English-language stations, or 23% of total viewing;**
- radio broadcasting, presumably because relatively low production costs enable Canadian stations to offer programming fully comparable to that of U.S. stations, as well as better reception and local content such as news and weather;
- directories, because they are primarily a by-product of telephone service. Telephone directories have traditionally been local because of the greater frequency of local calling and the prohibitive size of a national directory. Moreover, the yellow pages are essentially a retail advertising vehicle;
- cinemas, libraries, bookstores and newsstands are also inherently local because they are retail-type establishments.

3. Exports

Our poor performance as exporters of content is due to many of the same factors that make us importers - the small size of our domestic market, the lack of international stars, and the risk aversion of distributors.

* "L'industrie de la production d'émissions de télévision au Canada", a report by Alain Lapointe and Jean-Pierre Le Goff for the Department of Communications.

** Calculated from figures in an internal CBC study.

In some respects, we are caught in a vicious circle. The small size of the Canadian program production industry and its lack of major international successes means that income prospects are limited, and there is a sense that Canada is something of a backwater. These factors make it difficult to develop and retain top-flight creative people, which in turn makes our output difficult to market. The absence of a large number of international commercial successes also contributes to our marketing difficulties.

A further problem, though one that is more difficult to substantiate, is the lack of an export orientation by Canadian content producers. This reflects the fact that the content sub-sector consists in large part of:

- government agencies such as the CBC and National Film Board which have a mandate to produce content which is distinctively Canadian or meets other cultural goals. It is unlikely that a broad export market exists for such content, and these agencies have had little motivation to pursue such markets;
- foreign subsidiaries whose major role is to distribute or adapt the content produced by their parent publishing or sound recording companies;
- private broadcasters who produce Canadian content to meet CRTC requirements, but who do not believe that the higher expenditures necessary to produce an exportable product are likely to be profitable;
- magazine publishers who see better prospects in the partially protected Canadian market than in direct competition with the Americans on their own ground; and
- small firms which may be motivated to market abroad, but lack the resources to do so on a sustained basis, or perhaps even to produce world class content.

On the other hand, we should not ignore the areas, however isolated, where Canada has achieved a positive trade balance. Two examples are Harlequin romances and the production of television advertisements. Success in these areas appears to be due more to entrepreneurship than any particular factor endowment. In fact, one important advantage may be that neither market

relies primarily on well-known performers. In television advertising, Canada could compete on the basis of cost, and could establish a reputation with a relatively small group of commercial customers. For Harlequin, name authors were also less important than the development of a very homogeneous product line, whose brand name was promoted effectively. Other examples are the magazine "Harrowsmith" and the television program "SCTV".

This tends to suggest that our best export prospects lie not in blockbuster films or bestselling novels, where costs are high and we have difficulty in marketing, but in products which appeal to more specialized audiences. The problem is that the revenue to be derived from such products is often much lower than for mass-market items.

4. Price and Quality

It is extraordinary difficult to assess whether Canadian households and businesses receive good value for the money they spend on content, because there is so much subjectivity in the assessment of quality. However, some view on the matter must be ventured in assessing the performance of the content sub-sector.

First, the fact that our borders are largely open to imported content implies that what is available to us is comparable in quality to the content available in other countries. Indeed, much of the content Canadians choose to consume is identical to that consumed by Americans. However, we have the option of Canadian-made content.

Second, comparisons of content prices between Canada and the U.S. do not yield any consistent result. Imported books are said to be more expensive in Canada, even after allowing for the exchange rate differential. So are subscriptions to some magazines, including Time. Major Canadian magazines tend to be less expensive than their imported counterparts from the standpoint of the consumer, but they appear to be more expensive for the advertiser. And American television programs, to the extent that they are

sold to Canadian networks at less than the average cost per viewer which applies in the U.S., should cost the Canadian consumer less than his American counterpart in terms of the advertising costs embodied in the products he buys.

On the other hand, Canadians are faced with a substantial bill for Canadian content, and for measures to improve access to content. Much of this bill is in the form of taxes, but some is in the form of higher costs or lost revenues in the private sector, which tend to be passed on to the consumer. For example, the average Canadian presumably ends up paying indirectly for Canadian content on private television. If this Canadian content were of particular cultural merit, ballet for example, one might say that it is reasonable to ask the general public to pay even if they choose not to watch. The case for subsidies to accessibility for the underprivileged or those in isolated areas is also relatively clear, whether or not one agrees with it. However, if the only distinguishing merit of a program is that it is made in Canada, and people choose not to watch it because it does not appeal to them as much as a similar imported program, the question of value for money is much more problematic.

Economic Trends

1. Historical

In some respects, the content sub-sector has shown comparative stability over the past decade. Advertising expenditures as a percentage of GNP have remained roughly constant over the past decade at 1.2% of GNP.* The average number of hours of television watched by Canadians has remained steady despite rapid increases in the number of television stations and in the penetration of cable TV (from 17% in 1970 to 53% in 1980), color TV (from 13% to 77%), converters (from zero to 16%) and second TV sets (from 21% to 36%).** Moreover, no new medium had any major market impact during the decade.

* Based on Maclean-Hunter Research Bureau data cited in the Report of the Royal Commission on Newspapers, p. 74.

** From an internal CBC research study.

This relative stability has meant an intense struggle for existing markets. The television audience has become more fragmented as people gained access to a greater number of channels, both off-air and via cable. The allocation of advertising dollars among media has also shifted, with television continuing to gain and daily newspapers to lose, as Exhibit 7-5 overleaf illustrates.

Newspaper circulation has grown relatively slowly, up 17% from 1970 to 1980. Although this is more rapid than the growth of population at 13%, it is far slower than the 33% growth in the number of households, a more relevant indicator.*

Cinema admissions have been relatively static, and appear to have fallen behind population growth. However, trends are difficult to detect because of substantial year-to-year variations.** What is clear is that the cinema has never regained the position it held before the introduction of television. For example, the average Canadian went to the cinema 16.9 times in 1950, compared to 4.3 times in 1979.

Recording industry unit sales rose very rapidly from 1970 to 1978, but have since declined. Net shipments of records and tapes manufactured in Canada totalled 84.6 million units in 1980, up 91.8% from 1970 but down 10.1% from 1978.*** Reasons for this decline may include:

- slower growth in the 15-24 age group, who are the heaviest record buyers;
- higher record prices, caused in part by increases in the price of petroleum-based raw materials; and


* Royal Commission on Newspapers, p. 5.


** Statistics Canada Catalogue, 62-207 and "Historical Statistics of Canada", series 213-226.

*** Statistics Canada 47-004, December 1980 and 87-615, 1978.

EXHIBIT 7-5

CHANGES IN DISTRIBUTION OF
ADVERTISING EXPENDITURE BY MEDIUM

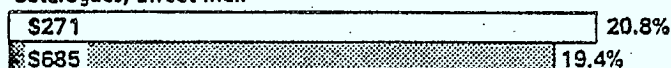
1972  \$1,303 Total advertising (millions of dollars)

1980  \$3,528 Total advertising (millions of dollars)

Daily newspapers



Catalogues, direct mail



Television



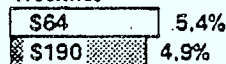
Radio



Outdoor advertising



Weeklies



All others



Source: Report of the Royal Commission on Newspapers, based on data from Maclean Hunter.

- possible increases in home taping, bootlegging and counterfeiting.

Other changes in the content market over the past ten years include:

- a shift in book sales from elementary and high school textbooks to mass-market paperbacks;
- the growth of audio tapes and cassettes compared to records;
- the closure of a number of "family" newspapers in major cities, counterbalanced in part by the growth of tabloids; and
- the gradually increasing reliance of newspapers on advertising rather than circulation revenues.

There have also been significant changes in the operating technology of the content sub-sector. Publishers, particularly of newspapers, have adopted electronic technology for text editing and to replace typesetting. Television has adopted portable video cameras and satellite transmission.

2. Future

Content is not one of life's necessities, but it is an important part of our enjoyment of life. Information on the external environment is also vital to effective management in a complex and demanding economy. It is therefore reasonable to believe that the proportion of national income devoted to content will tend to increase as the economy continues to develop. However, it would be unreasonable to expect a dramatic increase over a period as short as the next decade.

One development that can be predicted with greater confidence, because it is already under way, is the proliferation of distribution channels for audiovisual material. Cable television and converters were early steps, followed by the introduction of special channels such as the House of Commons broadcasts which are available only via cable. Pay television will soon be

joining the scene, although it is arguable that it will not have the same market appeal in Canada as in the U.S. because of the wide range of options already open to Canadians. Videocassette recorders have been available for a number of years, but their market penetration remains lower in Canada than the U.S.* Videocassette rental outlets are now mushrooming and video-discs have also entered the market, but it remains to be seen whether the prices of equipment, cassettes and discs can be brought down to a level where they have a mass market. Direct broadcasting by satellite is also a possibility, although its viability, particularly in economic terms, remains under study within the Department of Communications.

In the past, the cinema was the only channel through which the consumer paid directly for audio-visual content, and its importance has declined compared to television. Pay television, videocassette and videodisc will all tap the consumers' willingness to pay for audio-visual content, and will therefore tend to increase the total amount available for content production. The proliferation of channels and the availability of more money for programming may produce a scramble for content. Better opportunities will also be created for the distribution of minority-interest programming, which may tend to increase viewing among the better educated. Early evidence from the United States suggests that pay television viewing is incremental, rather than cutting into the time spent watching conventional channels. However, the effect may be different when the new service becomes better established. Competition for content may also force up the costs of conventional channels. Another important consideration from a regulatory standpoint is that wider choice will make it even more difficult to influence what people watch by controlling what is shown.

The consequences of the proliferation of channels for the content sub-sector in Canada are far from clear. Pay television licence applicants are willing to promise large infusions of cash into the independent production sector, but it will be difficult to sustain these if audiences are not forthcoming.

* There are 125,000 VCR's in use in Canada, compared to 3 million in the U.S. "Little chance of video lawsuits here, TV chief says", Toronto Star, October 21, 1981.

for Canadian content. Moreover, history suggests that, given a wider choice of channels, Canadians will watch an even higher proportion of imported programs. At the same time, the proliferation of channels in the United States should improve our chances of exporting, particularly if we are able to establish a reputation in some minority-interest markets.

The revenue potential of these export markets should not, however, be exaggerated since it is precisely their willingness to accept low-cost programming which gives us a marketing opportunity. It should also be noted that Canada has not attracted any videocassette or videodisc duplicating plants to date, and our ability to promote the reproduction and sale of Canadian content through these new vehicles remains to be demonstrated. In purely commercial terms, broadcasters and multi-media companies are scrambling to reposition themselves, as witnessed by their involvement in pay television licence applications.

The print media will also face a more competitive market, although a rapid decline is unlikely. One factor is the possibility that pay television, videocassettes and videodiscs will attract better educated consumers who have preferred books and magazines to traditional mass appeal television programming. Another factor is that new computer-based services such as Telidon will compete with print as sources of information, particularly for:

- . business data;
- . classified advertising;
- . retail advertising, for example of supermarket specials;
- . directories;
- . catalogues; and
- . tabular information such as sports scores and stock quotations.

Electronic information services for business and government use have grown rapidly in certain niches such as securities prices, economic statistics, legal information, patents and bibliographic and abstract services. However, it remains to be seen how many additional applications there are where business demand for external information can be met most effectively by electronic means. Videotex systems such as Telidon are in competition with conventional computer terminals and with new devices such as the Display-phone as a means of displaying such electronic information for business.

There is the possibility of a massive home market for videotex if hardware and usage costs can be made low enough, and if sufficiently attractive applications can be found. The best prospects seem to lie in tele-banking or tele-shopping applications, since field trials show little consumer interest in information retrieval systems. However, we remain to be convinced that either Telidon or its competitors will achieve widespread home use within this decade.

The diversion of content to videotex systems could be a major threat to the economic base of newspapers, which is in retail and classified advertising. It would also accelerate the trend for newspapers to become more like magazines, with more emphasis on features than up to the minute information, and an orientation which is less local and more to demographic groups. Publishers have responded partly by diversifying into electronic information services, a move made easier by the fact that more and more of their own content is stored electronically.

At the same time, book publishing on a small scale may become more economic with technological innovations such as laser printing. This raises the question of whether appropriate marketing channels can be found for such minority-interest publishing. Specialized mail order services are one possibility.

Another implication of the proliferation of content media which seems to have received relatively little attention is the problem which customers will have in choosing the entertainment most suited to their tastes, or locating the most pertinent information. The likely consequence is a rapid growth in professional reviewing, program directories, abstracting services and bibliographic services.

Key Issues

Economic trends in the content sub-sector raise some new issues, and revive others. These issues are discussed briefly below.

Perhaps the most fundamental issue is whether government stimulus should focus on content which is distinctively Canadian, or has other cultural merits, or on content which is marketable, and especially exportable. The problem would disappear if a large export market proved to exist for distinctively Canadian content, subject to the money being available to ensure high quality. The success of Swedish and more recently of Australian films is encouraging, but their appeal has been to a relatively small and sophisticated public, rather than to the mass market, and novelty itself may play a role. We would therefore be reluctant to base an economic development strategy, where long-term revenues and profitability must be major concerns, on the hypothesis that there is a broad public in other countries with a continuing interest in our culture. Since there are also obstacles to competing with big budget Hollywood productions for mass entertainment audiences, the challenge is to identify specific market segments where a relatively small country can compete successfully and profitably.

Another important philosophical issue is the extent to which governments and their agencies can be expected to "pick the winners" which should be heavily funded to achieve international competitiveness. Identifying projects which will succeed commercially in a fashion-oriented industry is difficult for anyone, and demands a "feel" for market conditions which is hard to maintain. There is a risk that government officials will tend to apply their

own tastes and values, rather than those of the market. They may also be inclined to shy away from material which may be controversial. The record of the Canadian Film Development Corporation in these respects may be relatively good, but its operations have been small enough to avoid major public attention.

The government's policy of developing a more export-oriented program production industry by favouring independent producers also requires critical examination. It may be the only serious alternative, given the failure of the CBC to develop export markets in the past and the apparent lack of interest by the production affiliates of CTV stations in developing world class programs, rather than simply filling Canadian content quotas at minimum cost. However, it is legitimate to ask whether the independent producers have the financial strength and can achieve the scale of operations necessary to produce and market programs on a world scale.

The alternative is some form of government policy which would promote the rationalization of Canadian-owned independents in such industries as book publishing, sound recording, film and television program production. In most economic sectors, one would argue that such rationalization would increase international competitiveness. However, there is a risk that it would stifle the creativity and risk-taking necessary for a small country to establish itself internationally. In parts of the sector which are information-oriented, such as databanks, the social importance of diversity of information sources within Canada must also be considered.

The federal government and the CRTC now appear to be pinning their hopes for the development of a more vigorous program production industry largely on pay television. Licence applicants have responded with promises of up to \$93.3 million a year for Canadian production.* While such figures are impressive, they are small compared to the CBC program budget of \$477.0 million for 1981/1982.** The history of commercial broadcasting in Canada leads to a certain pessimism about whether these commitments will

* "Promises, Promises", by Robert Fulford in Saturday Night, November 1981.

** "Estimates" 1981/1982. Includes radio, though television programming is the major element.

be honoured, particularly if revenues are not up to expectations. On the other hand, if pay television attracts large audiences in Canada, the public and industry pressure for licensing of additional channels may make it politically difficult to limit the number of channels in order to protect budgets for Canadian content.

Pay television also raises the broader question of the role of cable systems in programming and program production. To date, their efforts have been limited in most cases to relatively low cost community channels, simple text material, House of Commons broadcasts and some special events, although some companies such as Videotron have been more ambitious. Audiences are generally small, and the impact on the number of subscribers appears modest. However, programming services may become vitally important to cable systems if satellite receiving dishes become economic for households.

Canada has not established a strong position to date in the production of videocassettes and videodiscs. We face the dual questions of whether we should devote public resources to these industries, given their uncertain prospects, and how those resources might be employed most effectively to establish a competitive position. For example, is it important for us to be involved in the physical production of videocassettes and videodiscs, should we be satisfied to have Canadian "publishers" with the physical production being contracted out for the present or should we simply market Canadian content to existing "publishers"?

In electronic information services, we face the question of whether the Telidon technology provides us with the distinctive competence needed to establish an information provider industry for export markets. If not, what can be done to strengthen Canadian participation in the growing business market? A related question is whether we should promote rapid development of tele-shopping, tele-banking or similar services in the hope of becoming world leaders in the necessary software.

Another broad question is how content from Canada can be marketed more effectively abroad. This implies both the identification of export opportunities, and the promotion of suitable products. Is the long-established Trade Commissioner Service an adequate form of support, or is some more specialized body needed to promote exports of cultural products?

VIII - COMPUTER SERVICES SUB-SECTOR

Description

In-house data processing activities were excluded from our study with the agreement of the Department, even though industry sources estimate that in-house activity is seven to nine times as large as open market activity. The factors affecting the growth of in-house activity are complex, and the scope of our study had to be limited for practical reasons.

The computer services sub-sector as defined in this study includes the following products and services:

- data processing services, usually offered through service bureaus;
- software, either as packages or custom developed;
- turnkey systems that include both hardware and software;
- EDP educational services;
- specialized consulting services; and
- data preparation services.

Some information is also included on companies whose principal activity is the sale or rental of EDP hardware, as opposed to its production. These firms are relevant to the sub-sector because some of them, like IBM, are also engaged in service bureau activities. There are also firms whose main business activity is not related to computers but who sell data processing services as a secondary activity. This may reflect either temporary excess processing capacity, or a long-term commitment. However, statistics are no longer readily available on such activities.

The total 1979 volume of the computer services industry was 638 million* according to Statistics Canada, although some industry sources suggest that the figures are understated. Of this, 55.9% was for processing services, 21.3% for software and 22.8% for other services. Departmental estimates indicate that a further \$150 million of computer services revenue was earned by companies whose principal activity is the sale or rental of EDP hardware.

* Statistics Canada Catalogue 63-222, Annual.

Key Characteristics of Demand

The computer services sub-sector essentially competes with in-house activities. For any organization, the choice between using an in-house computer or a service bureau, or developing a system in-house as opposed to buying it outside, is a "make or buy" decision. This decision may be made by a simple comparison of costs, but usually takes into account other factors. The use of a service bureau, for example, may make it easier for a company to control and limit usage costs and may ensure prompt service. The use of a software house to develop a system may be the only way to deal with a peak systems development workload.

The user's choice of a particular service bureau obviously takes into account costs, but also many other factors including:

- access to the bureau's network;
- proprietary software available;
- reliability and back-up;
- access to data banks;
- technical expertise; and
- flexibility.

The choice of a software vendor depends also on costs but on other factors such as:

- industry expertise;
- features and characteristics of the software, in the case of packages;
- documentation and training; and
- reputation.

The current high demand for software services has been partly caused by the shortage of programmers. Some companies have to buy software services outside simply because they cannot hire the programmers they require. Software houses find it easier to attract personnel because of the glamour of being a "consultant", and the prospect of more varied and challenging work.

There is usually a close relationship between the supplier of computer services and his customer, which means that the customer has to be very confident of the capability and reliability of the supplier. One reason is that the cost of a changeover from one service bureau to another, or even from a service bureau to an in-house facility, is high both in terms of direct costs and of the disruption it causes. Changing software vendor may cause similar problems - getting to know new people and techniques can be disruptive. Even if the software vendor is not providing the best service, changing vendors part way through a project means starting over, and organizations will often live with a less than satisfactory situation because they cannot afford the time it would take to begin again.

Key Characteristics of Supply

The "raison d'être" of a computer service bureau is economies of scale, or in other words the ability to offer a cheaper or better service than the customer could provide for himself. With the advent of newer and much lower cost equipment and the increasing cost of computer specialists, the economies of scale may relate more to people and software than hardware.

The service bureau component of this sub-sector remains capital intensive, and the industry is characterized by proportionally high fixed cost. The rate of depreciation is an important determinant of reported profitability, but the decrease in computer costs has been so dramatic that in some cases the replacement value is lower than the book value of the equipment.

Capital intensity implies that significant investments are required to enter this industry successfully on a large scale. Customers will also be reluctant to confide something as vital as their data processing activities to an unknown supplier. A number of the large service bureaus therefore had their origin as the EDP departments of major users. A small service bureau catering to a specialized local market can be established with a small computer and requires a relatively low investment, but even the small firm requires enough working capital to operate while it builds a customer base. The small firm also is coming under increasing competitive pressure as mini and micro computers become even better known and more affordable.

Telecommunications are another significant cost element in the service bureau industry, particularly in determining the location of production facilities. It is mainly for this reason that the large service bureaus are located where there are large data processing markets, which is to say in Toronto, Calgary, Ottawa and Montréal.

The Canadian service bureau industry has specialized to a large extent to remote batch services. Interactive on-line service offerings are relatively new for the large Canadian bureaus, although a number of smaller firms have specialized in this area for some time. Interactive on-line services appear to be more important in the United States.

The heterogeneity of the service bureau industry, namely the various combinations of services offered by each firm, has enabled firms in the industry to reduce head on competition based strictly on price. However, the relatively low profitability of the industry is partly a reflection of such competition.

The software services component of this sub-sector is basically a people business. The key ingredient for success is skilled computer specialists. Although it is possible to enter the custom programming segment of the industry with literally no investment, the trend towards software packages will mean that larger investments will be required to develop packages and bring them to market. Recently, one major Canadian software vendor has raised several million dollars through a share offering, principally for the development of new software products. Identifying market opportunities is difficult as many software packages have similar functions, operate on the same equipment and are differentiated only by sometimes minor technical or operational features.

The hardware vendor has an important role to play in the supply side of the software industry. A software vendor may sell the software to the hardware vendor for the latter to distribute, or may simply promote it to the hardware vendor who may use it as a lever to sell hardware.

Industrial Organization

The computer services sub-sector is relatively new and it is not possible to segment it precisely. However, one approach is to break it down into three industries:

- service bureaus whose business is mostly the sale of computer services;
- software houses who develop customized software for customers, or who develop and market software packages;
- system houses who provide turnkey solutions consisting of hardware and software.

The sub-sector is much less concentrated than most other parts of the communications/information sector, with 689 firms reporting to Statistics Canada in 1979.* At that time, the 35 largest firms controlled 80% of the revenues.

Concentration appears to be greatest among service bureaus, although there are a number of smaller bureaus catering to markets such as municipalities and smaller businesses. Barriers to entering the service bureau business on a major scale include:

- demonstrating to potential clients that you are competent and reliable and that you are likely to be around for many years to come. This is important because the costs of changing over to a service bureau or software package are substantial, making a long-term commitment desirable;
- securing the required capital; and
- recruiting qualified manpower.

In fact, many of the major service bureaus such as CSG and Datacrown were able to overcome these barriers precisely because they originated as the data processing departments of major users.

Merger or acquisition is an attractive growth strategy for service bureaus because it enables them to:

- reap the benefits of additional economies of scale. Although economies of scale in hardware may be less obvious with the newer technology, it may be possible to service substantially more customers without large addition to specialized personnel;
- gain additional network capability;
- obtain scarce manpower;
- gain new clients which would be very costly to do otherwise; and
- reduce risk through the portfolio effect.

* Statistics Canada Catalogue, 63-222, Annual.

However, mergers are not always easy to implement. The integration of two companies in a single efficient business unit and the conversion of all clients to a single service system can be difficult and costly to achieve, as some Canadian service bureaus have learned.

Concentration also appears to be growing among software houses because of the investment required to develop packages and the marketing advantages of an established reputation, a large team and the assurance that the firm will remain in business long enough to maintain the software.

The sub-sector is mostly Canadian-owned and operated - 83%* of revenues generated in the sub-sector flow to Canadian-owned companies. This figure is overstated, because it does not take into account purchases of software packages from outside Canada, or sales of processing services by equipment suppliers, most of whom are foreign-owned. However, the fact remains that the industry is largely Canadian-owned. This may be due to the fact that losses or low profits made the industry unattractive as a takeover target in its early days, and FIRA now provides a form of protection.

Government Involvement

The main federal government program related to this sub-sector has been the contracting out of a substantial portion of the government's own requirements. This program has provided significant volume to this sub-sector, and appears to have been particularly important in the early years of the service bureau business. On the other hand, industry spokesmen suggest that government should contract out a much higher proportion of its data processing activities. The government feels that it has contracted out whenever it was efficient to do so, and that contracting out was never intended to become a subsidy program. Indeed, the industry itself has mixed feelings about government business because it tends to be very price competitive, and consequently the margins are low.

* Canadian Computer Industry - Working Paper, Department of Industry, Trade and Commerce, July 1980.

Other government actions have had an impact on the computer service component, even though they were aimed at other purposes. In particular, the tariff and federal sales tax on computers make the capital costs of service bureaus proportionally higher than in the US. While the bottom-line impact may also be a few percent of operating revenues, this difference may be important in competitive bidding situations, and in terms of the ability of service bureaus to generate and attract equity capital for expansion. The industry also expresses concern about the level of long distance telecommunications rates in Canada as compared to the US. Industry feels that its competitiveness in the US market and abroad has been adversely affected by government policy in these areas, and that its competitiveness in the Canadian market may also be in jeopardy if no action is taken with regards to those two important cost elements.

Economic Performance

No official statistics are available on the trade balance for the computer services sub-sector. However, estimates by the Department of Communications indicate that Canada has a positive trade balance of \$30 million* in the service bureau industry.

Our positive trade balance in this area appears to be due to:

- the relatively early start of service bureaus in Canada, due to the federal government's contracting out policy and cutbacks in funding for university computer centres, which had previously serviced the private sector using their spare capacity;
- the orientation of the Canadian market and Canadian service bureaus to remote batch processing, while US firms tended to concentrate on interactive services;

* "Preliminary estimates of costs of computer use to 1990", an internal document by L. A. Shackleton of the Department of Communications, July 1981.

- the preference for local suppliers, particularly in the early days of service bureaus when data communications were less reliable;
- innovation in services, as witnessed by the success of I.P. Sharp; and
- aggressive marketing.

Trade figures for the software industry are even more difficult to obtain. For customized software, development tends to be done close to the client because of the need for frequent contact during both development and implementation. However, there appears to be a substantial trade deficit in software packages. Packages are characterized by high development costs, but negligible costs for production of additional copies and for transportation. The natural market is therefore worldwide, except in product lines such as payroll systems where legal differences are important. This does not mean that Canada will necessarily be an importer, and some packages such as the Air Canada reservation system have been exported, but to date the US has led the world in developing software packages for large computers.

Another form of trade which may be very significant, although it is outside the sector as we have defined it, is the use of US parent company computers to process the data of Canadian subsidiaries. There is no reliable information on the extent of this practice, but some service bureaus report that they are feeling the effect of increased trans-border data flow. In other words, potential or former customers are now getting their processing done by the American parent. In a previous report, we suggested that centralization of in-house systems development by multinationals may be an even more serious threat to Canada's economic health, although again there is a lack of reliable information.*

* "Economic Implications of Canadian Trans Border Data Flow", a report by Price Waterhouse to the Department of Communications, 1981.

The computer service sub-sector employs a substantial and rapidly growing number of people in Canada. As Exhibit 8-2, overleaf, illustrates, employment in computer services grew at an average annual rate of 10.0% between 1974 and 1979, reaching a total of 14,400 jobs, according to Statistics Canada. Some industry sources believe that the true figures are higher. A further 110,000 people are employed by in-house data processing groups.* However, there is already a scarcity of systems analysts and computer programmers, so the creation of jobs in these fields may not be an objective. Indeed, one could argue that one of the principal benefits of the computer service industry is that it makes more efficient use of these scarce resources than if they were employed in-house.

Economic Trends

The sales volume of the Canadian computer service industry grew at an average rate of 25% from 1974 to 1979, according to Statistics Canada data.** Industry sources indicate that growth for service bureaus is in the order of 20% per year. The software industry also appears to be expanding rapidly, although no regular official statistics are available. Exhibit 8-1 opposite shows the growth in operating revenues in computer services, and for companies engaged primarily in sales and rental of EDP hardware.

The use of computers will undoubtedly continue to grow rapidly for the foreseeable future, expanding into other business functions and smaller enterprises. There will be a corresponding demand for new types of application software, and for improved versions of what already exists. What is much more difficult to predict is the percentage of data processing and software development which will be done by the service industry rather than in-house. Even relatively small shifts in market share can have a dramatic effect on the service industry, since it represents only 10-15% of total EDP expenditures.

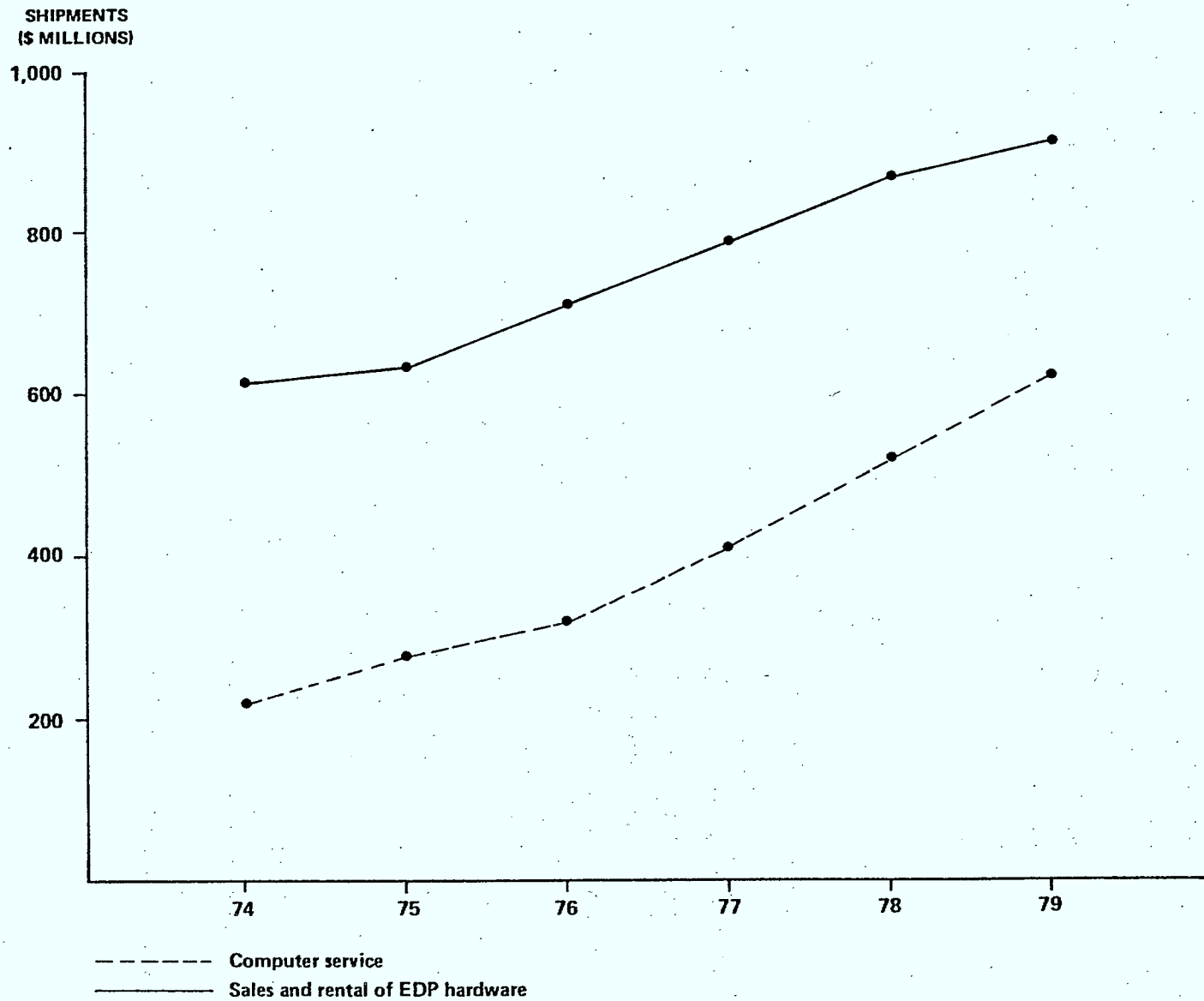
* Estimate by L. A. Shackleton, Department of Communications.

** Statistics Canada Catalogue, 63-222, Annual.

COMPUTER SERVICE SUB-SECTOR

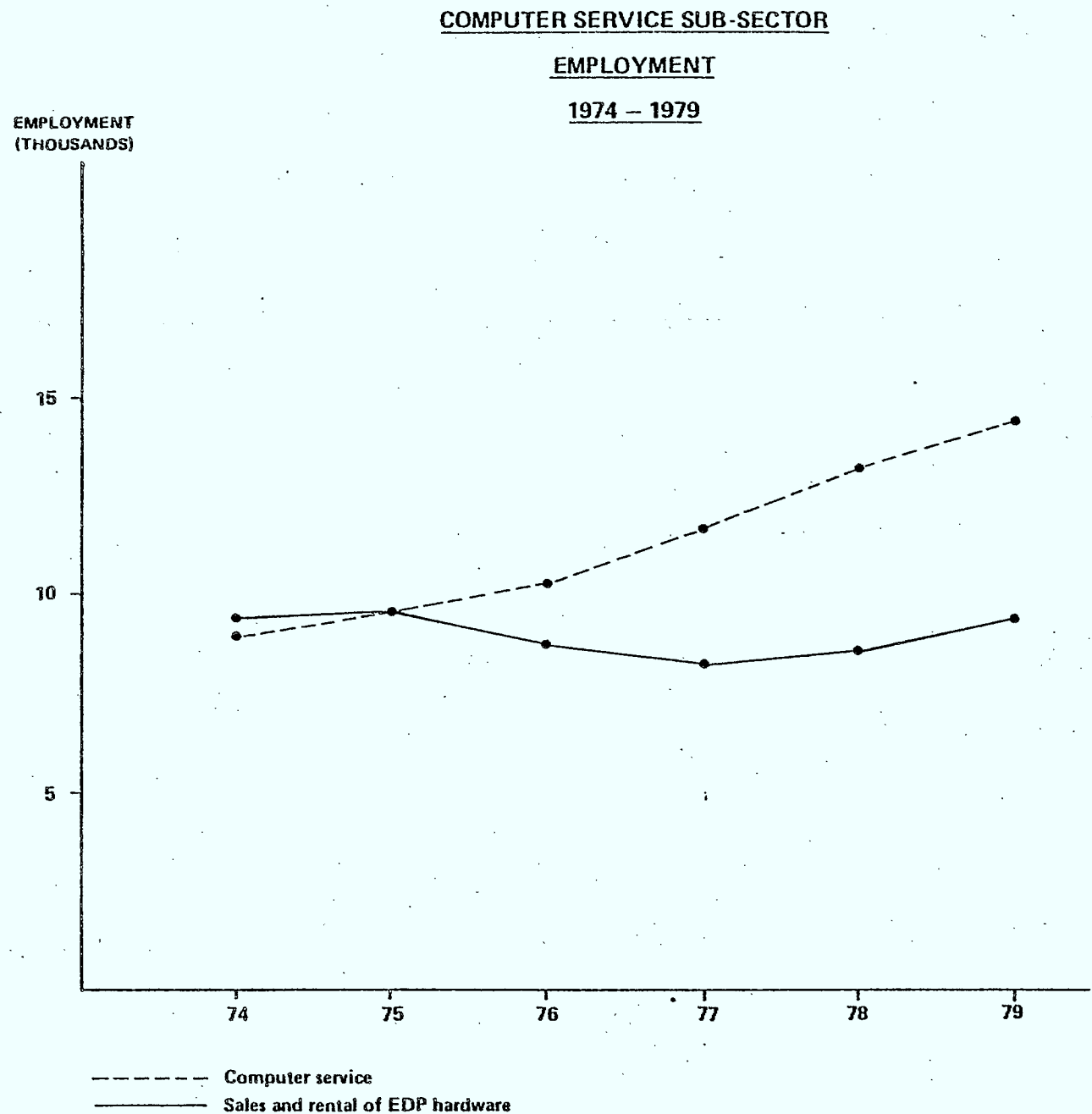
OPERATING REVENUE

1974 - 1979



Source: Statistics Canada Catalogue 63-222 annual

EXHIBIT 8-1



Source: Statistics Canada Catalogue 63-222 annual

One threat to the industry is that changes in the relative prices of different sizes of EDP equipment will eliminate economies of scale, or that they will simply become unimportant with the decreasing cost of hardware. The service bureau industry would then have to differentiate its product further through software, databanks, networks or other "bells and whistles", since it would have difficulty competing strictly on a price basis against the in-house alternative. In their early years, large service bureaus offered a "number crunching" service - they sold the power of a large computer and because of cost performance it was an attractive alternative to the in-house facility - but this will be a less and less viable strategy. Apart from changes in the equipment cost structure, service bureaus will also need to differentiate their product, and perhaps rationalize their activities by dropping less profitable services, in order to improve their profitability.

One immediate effect of lower hardware costs has been to encourage the growth of distributed processing systems, with customer-owned mini-computers used for input. This has decreased the bureaus' sales in the area of data entry/editing. However, there appears to be a growing demand for bureaus to provide host computer services. They may also have a role in selling the equipment to carry out the portion of processing which is distributed.

While the unit cost of computer hardware continues to decrease, there is a chronic shortage of systems analysts and computer programmers. This shortage, which is unlikely to be overcome in the short term, poses operating problems for the computer service industry. However, it also has a major effect in increasing demand for its output, since clients have difficulty recruiting enough people to maintain existing systems, let alone developing new ones. Software is generally considered to be the fastest growing component of cost for EDP users. Japanese sources have even estimated that it could represent as much as 85-90%* of total costs by 1985, including in-house development and maintenance, although this projection seems unlikely to be realized in such a short time frame.

* JIPDEC report.

The outlook for software houses is therefore very encouraging for the next few years. We are likely to see continued growth, particularly in large firms offering package solutions to common business needs, and selling on a North American or world basis.

Long term prospects for software houses are much less clear. It is probably unrealistic to imagine a time when all the important business application systems have been developed. There will always be changes in the environment, and room for improvement. Moreover, if the scarcity of programmers continues, there will be strong economic incentives to reduce requirements for them. There are already a few products on the market that purport to eliminate the need for programming. The products are still crude, but new ones will come along. Moreover, if schools continue to expose more and more people to computers, programming may become as common a skill as writing memos. If there are indeed breakthroughs, then the software houses as we know them today would either disappear or change orientation. They could become, for example, specialists in subject matter areas such as hospital management or maintenance management.

The small business or home computer (e.g. Apple or Radio Shack TRS-80) also generates a rapidly growing and potentially vast market for cheap software. For home use, this software will tend to be of the entertainment type, such as video games. These products will be "trendy", coming and going much like hit records or bestselling books. The main ingredient will remain creativity on the one hand, and mass market distribution on the other. The actual programming may well be a cottage industry, but with large firms doing the "publishing". There are obvious parallels to sound recording and book publishing, fields in which Canada has done rather poorly. However, this experience need not be repeated.

The effect of the integrated office on the computer service industry is uncertain. The system houses may well be the ones to penetrate this market with hardware/software solutions to the problem. However, the technology is still evolving and definitive trends are not clear, so the risk will be high. For the service bureaus, there is a potential threat in that businesses may see a stronger need to have their own computer if it acts as the control centre for a more complex integrated electronic office.

Policy Issues

In formulating policy directed at open market computer service activities, it is important that the government not overlook its possible impact on the much larger portion of data processing activity which occurs in-house. For example, a policy of free trade in data processing services may well benefit the service bureau industry, which sees important opportunities in export markets. However, benefits in this area could be more than offset by a migration of in-house processing from Canadian subsidiaries to the computer centres of their US parents. It is equally important to remember that the development of software and databanks is likely to be more significant in terms of highly-paid jobs than the actual operation of computers.

Some specific policy issues which may be important in the next decade are as follows:

- Should the federal government provide venture capital for the development of application software packages, or encourage others to provide such capital through tax incentives such as those provided for film investments?
- Should a special effort be made to develop Canadian-based "publishers" of micro-computer software?
- Should the development of software for new home services such as tele-shopping and tele-banking, perhaps based on Telidon, be a major area of emphasis?
- Should the tariff and federal sales tax on EDP equipment be reduced or eliminated to encourage the location of service bureaus or in-house data processing facilities in Canada rather than the US?

- Should the government take an active role in promoting mergers, joint ventures or other forms of co-operation among software and systems houses in order to develop Canadian companies which can compete effectively in world markets?
- Should the federal government be attempting, through manpower training program or pressure on the provincial governments, to increase the output of systems analysts and other computer specialists?
- Should non-tariff barriers, such as non-deductibility of expenses for tax purposes, be used to discourage imports of software or data processing services? If so, should these restrictions apply to in-house, as well as open market activity? What implications would there be for our international relations?

IX - COMMON THEMES

The purpose of this chapter is to draw together some of the themes which have emerged in the four sub-sector chapters, and in those which preceded them. The characteristics of the sub-sectors, and indeed of the individual industries within them, are often very different. However, because of the linkages described in Chapter II, the sub-sectors can have a profound effect on each others' development. The overview in this chapter therefore sets the stage for the discussion of policy issues at the sector level in the final chapter.

Relative Size

Carriage is by far the largest of the sub-sectors in terms of the production of goods or services in Canada for sale on the open market. Even though much of the sub-sector is capital-intensive, it employed 162,000 people full-time in 1980, compared to 85,000 for content, 53,000 for equipment and 14,000 for computer services. Only by taking into account the 110,000 people estimated to be employed in EDP activities within businesses and government could one find another sub-sector of the same magnitude.

Key Demand Factors

Most products and services are sold either largely to business (including governments and public institutions) or largely to consumers. The overlap, where it exists, may be in markets such as small business or affluent consumers. This conventional pattern applies to much of the communications/information sector. For example, television sets in offices are rare, though perhaps not as rare as photocopiers in living rooms. However, the separation of business and household markets is far from absolute, as shown by Appendix C. This matrix is an attempt to list the major flows of products and services among components, and from each component to households and businesses generally.

Some of the relationships which emerge from reviewing the matrix are as follows:

- the computer services component is almost entirely business oriented, while the content component is oriented largely toward households, even if an advertiser pays the bill. Business is also the predominant market for equipment, and to a lesser extent for carriage;
- differences in content, rather than physical form, may distinguish the products intended for business as opposed to household markets - for example, textbooks as opposed to hardcover trade books, business magazines as opposed to those for consumers or, for that matter, television advertisements as opposed to programs;
- in most aspects of carriage, the service would be far less valuable to the customer if it were not used by both businesses and households. Use of the mail for billing and payment and of the telephone for taking retail orders are examples;
- many content products such as television and radio broadcasts, newspapers and magazines must be sold simultaneously both to households and businesses. These products are paid for in whole or part by advertising revenues. However, advertising would not be forthcoming without readers or viewers, who may also pay a portion of the costs. With pay television, it becomes technically feasible to extend the concept of shared advertiser/viewer financing to that medium as well;
- price discrimination may be practised when similar products are sold both to businesses and households. For example, businesses pay more for local telephone service and do not have effective access to off-peak rates for long-distance. On the other hand, the incoming chief executive of Canada Post has speculated on the possibility of volume discounts for large business mailers;
- opportunities for growth for some communications/information companies may come from expanding their market from large businesses to smaller ones, then upper income households, then the population as a whole. This is the progression envisaged by many for computers, and is one possible growth path for videotex.

Key Supply Factors

1. Technology

The communications/information sector itself is becoming increasingly mechanized and technically sophisticated. The microelectronic "chip" is becoming more and more the common building block. This applies even to industries which are mature or actually in decline from a market standpoint. The on-line computers used to enter and edit telegrams are a particularly striking example. Some other areas where technology has or will produce major changes in operations are:

- digital transmission, digital switching and fibre optic cables in telecommunications;
- optical character recognition and mechanized sorting in the post office;
- substitution of videotape for film in program production;
- word processing and photocomposition in publishing, particularly of newspapers;
- declining hardware costs for service bureaus and their customers, together with the growth of distributed processing; and
- greater mechanization in the production of equipment. Japanese television production is a conspicuous example, but IBM is also emphasizing mechanization in its own strategy.

This increasing mechanization generally increases output per worker. However, capital/labour ratios in financial terms may not increase because of the rapidly declining cost of the equipment itself.

2. Fixed costs

High capital/labour ratios, and high fixed costs generally, are characteristic of telecommunications and cable systems. In these industries, the cost of establishing a network to cover the service area is high, but the cost of connecting another customer is relatively low. Additions to trunk and

switching capacity also tend to be in substantial chunks, as do additions to the processing capability of service bureaus. As a result, incremental sales, particularly at off-peak hours, will tend to be very profitable, even if discounts have to be granted.

In high-technology aspects of the equipment sector and in much of content production there are major front-end costs for product development. These combine with the uncertainty of demand to create a relatively high level of business risk.

3. Skilled labour

The sector as a whole relies heavily on skilled labour. Some of these are technical skills, for example in equipment research and development; software development; installation, operation and maintenance of telecommunications equipment; and the technical side of program production. Some are creative skills, such as acting, writing, directing and editing. There are also positions which demand a delicate mix of business and technical or creative skills, such as film producers, technical sales people for equipment and commercial editors for publishing houses. On the other hand, parts of the sector provide considerable employment for less skilled people, for example as mailmen, couriers, and computer operators.

4. Financing

Differences in market risk and cost structure mean that some industries within the sector require very different forms of financing from others. Telephone companies, with a very stable demand for their product and a large asset base as security, can rely heavily on debt financing. At the other extreme, a small company producing a handful of films faces very high market risks and may have virtually no fixed assets. It has no alternative but to seek equity financing, either in the open market or from a large corporation. Software houses and smaller, high technology companies have somewhat similar

characteristics to film producers. Moreover, their growth may be so rapid that internal financing is insufficient even if profits are very healthy. Recent successful open market stock issues by Systemhouse and Mitel, as well as the sale of a 25% interest in Norpak to Noranda and CDC's investment in AES are all examples of equity financing in this part of the sector.

More critical financial problems may be faced by parts of the sector which operate at a loss and may have little immediate prospect for improvement. In cases such as the CBC and Canada Post, the government has so far been willing to pay the deficit. It has also provided a measure of assistance to smaller Canadian book publishers, and to certain equipment manufacturers such as Consolidated Computer and Electrohome.

Industrial Organization

1. Concentration

The degree of concentration varies widely across the sector.

At one extreme are the carriage activities which have traditionally been regarded as natural monopolies at least on a local basis - telephone, cable and to some degree postal service. These services tend to involve high fixed costs to establish the delivery network, and low marginal costs to serve additional customers. The company with the largest share of a particular local market will therefore enjoy a tremendous cost advantage over any competitor. However, this factor alone does not explain why these industries are concentrated on a national basis.

The monopoly carriers are facing increased competition from substitute services. One area which may be passing out of the realm of natural monopoly is long-haul business-to-business telecommunications. The size of the total market has grown tremendously, and technologies such as satellites facilitate entry by new suppliers. The post office is an institution which, despite its

theoretical monopoly seems beleaguered by actual and potential substitutes - courier services, long-distance telephone, possible private delivery services for high-volume items such as magazines, and electronic funds transfer systems.

There are other forms of concentration which are less readily explained in terms of operating cost savings or risks - the growth of newspaper chains, large cable companies such as Rogers Cablesystems, telephone companies stretching far beyond local markets and multi-media companies. Exhibit 7-4 opposite page 79 illustrates the range of some of these companies' financial interests.

One simple explanation for the growth of these large companies is that there were firms in the sector whose cashflow exceeded the reinvestment needs of their own operations. This is particularly likely when an industry approaches maturity. It would be normal for such a company to seek investment opportunities in other parts of its industry, or in similar industries where growth prospects appear better. The linkages discussed in Chapter II also suggest that some economies may be possible through cross-media ownership. To the extent that media such as broadcasting, newspapers and electronic information services are in competition for the same markets, a company may also wish to hedge its bets by being involved in all of them.

Vertical integration has also been a conspicuous factor in the sector, specifically in telecommunications equipment and television program production. In both cases, vertical integration arose at a time when the number of potential customers within Canada was very limited (oligopsony). Moreover, the operations of those customers depended very heavily on buying material of acceptable quality and price, so it is hardly surprising that they established their own sources of supply. Whether circumstances have changed in such a way that vertical integration is no longer in the public interest is another question.

2. Ownership

Governments have a very significant ownership stake in the sector, although they have shied away from publishing. Various levels of government control telephone companies (in all three Prairie provinces plus municipal systems in Edmonton and Thunder Bay), Teleglobe, the Post Office, broadcasters (the CBC, TV Ontario and Radio-Québec), the National Film Board and numerous libraries, and hold major interests in Telesat, CNCP Telecommunications, Consolidated Computer and, through the CDC, in AES and other office automation equipment companies.

The federal government has preferred to leave much of the broadcasting industry and cable systems to private ownership. However, it has required that this ownership be primarily Canadian.

Foreign ownership dominates where the importation of content or technology from abroad is a major element of Canadian operations. This is true of EDP equipment, film distribution, distribution of mass-market paperbacks and magazines, sound recording, and to some degree of book publishing. In other parts of the sector, Canadian ownership prevails, though there is no single reason why it does so. This is true of telephone companies, newspapers, computer service bureaus and software houses, for example.

Government Involvement

Governments, both at the federal and provincial levels, have taken a major interest in most of the industries within the sector. Regulation of telecommunications carriers and broadcasters is a conspicuous example. This involvement is analyzed in Chapter X, which follows.

EXHIBIT 9-1TRADE BALANCECOMMUNICATIONS/INFORMATION SECTOR

(Millions of dollars in 1980, unless otherwise specified)

	Imports (less re-exports)	Exports	Trade Balance	
<u>Equipment</u>				
Household Radio & TV Equipment	530.6	68.0	(462.6)	
Communications Equipment (including components)	1,593.6	1,041.0	(552.6)	
Office & Store Machinery	1,709.0	739.0	(970.0)	
<u>Computer Services</u>				
Service Bureaus*	30.0	60.0	30.0	
Software	N/A	N/A	N/A	
<u>Content Production</u>				
Publishing:				
- books	387.6	55.3	(332.3)	
- periodicals & newspapers	283.2	82.7	(200.5)	
Film and Videotape Production:				
- motion pictures	90.0**	N/A	(90.0-)	(1979)
- TV programs***	55.5	8.5	(47.0)	(1979)
Sound Recording:				
- records and tapes	16.2	9.4	(6.8)	(1978)
- royalties and lease payments	32.3	N/A	(32.3-)	(1978)
Advertising Revenues	N/A	N/A	N/A	
TOTAL - COMMUNICATIONS/ INFORMATION SECTOR	4,728.0	2,063.9	(2,664.1)	
TOTAL - CANADA	93,443.0	90,258.0	(3,185.0)	

N/A Not available.

* DOC estimates.

** Estimated from figures in Statistics Canada 63-207, Annual.

*** From survey by Bélanger, Chabot for DOC.

Economic Performance

1. Trade

The communications/information sector is a major factor in Canada's balance of payments deficit, as Exhibit 9-1 opposite illustrates. The figures are not complete, and there are statistical problems with respect to trade in services, but there is no doubt that the deficit was in the order of \$2.7 billion in 1980. This compares to a trade deficit of \$3.2 billion reported for all sectors of the economy. The deficit is heaviest in equipment, particularly office equipment (including computers) and electronic components. However, the content sub-sector also shows a significant gap.

Many services and some products in the sector are not traded to any major extent because they have characteristics that make them inherently local. Mail, cable, library and local telephone services could hardly be anywhere but close to their customers. Newspapers have also tended to be local because of the importance of timeliness, transportation costs and the preference of most readers for local and regional news. Moreover, retail and classified advertising, which are well suited to the print media because of their relatively high factual content, are addressed primarily to local and regional markets. The categories of television programs where Canadian production has been most successful commercially - news, public affairs and sports - share some of the characteristics of newspapers, as well as relatively low production costs. The development of customized computer programs also tends to be done near the client because of the need for frequent contact with the user during both development and implementation. However, the transborder satellite issue illustrates the danger of assuming that products which are now inherently local will remain that way as technology evolves.

In other parts of the sector, imports can occur on a large scale because there is little or no economic reason why production needs to be carried out near the consumer. Transportation costs are not a major factor for products such as EDP equipment, TV programs, software packages or books. Where transportation costs and tariffs are more significant, as in sound recording, the

original content can be produced elsewhere with only the physical manufacturing done in Canada. Factor endowments such as labour and natural resources also have relatively little influence on the location of communications/information industries. No country has a monopoly on brains, and all of the developed countries have sophisticated labour forces. The basic ingredient for making computer chips, silicon, makes up one quarter of the earth's crust. Moreover, both cultural and high technology products tend to be characterized by high initial costs to develop the idea and produce the first few copies, then lower or even negligible costs to produce additional copies. The natural market therefore tends to be world-wide, except for language differences.

To say that many communications/information goods and services will tend to be marketed on a world-wide basis does not mean that Canada must necessarily have a trade deficit in the sector. We do face certain specific handicaps such as:

- our small domestic market, which makes it more difficult to sustain the equipment research and content development necessary to compete on a world scale;
- the similarity of the US and Canadian markets, so that products which are popular in one are likely to sell well in the other;
- the possibility that producers located in the largest international markets may enjoy a marketing advantage in their own countries, allowing them to operate on a scale which makes it very difficult for producers in small countries such as Canada to compete;
- the nationalistic policies of other governments, particularly in relation to the equipment sub-sector; and
- our lack of an established international reputation and a strong production base in many product lines.

Canada does, however, have some export success stories in the communications/information sector, such as telephone switchgear, Harlequin romances, service bureaus and production of television advertisements. There were specific circumstances which made success possible in each of these areas, but the main common factor seems to be a determination to look beyond Canada to world markets.

2. Price/quality

Canadians have tended to pride themselves on the quality of their basic telecommunications services and on the speed with which innovations such as communications satellites, digital data communications and packet switching have been introduced. Whether these services are as economical and as well adapted to consumer needs as they might be is a far more difficult question to answer. However, when there is a large measure of monopoly, there is an inherent risk of excessive prices, inadequate service or both. Moreover, businesses such as service bureaus have often complained that long distance rates are much higher in Canada than the U.S.

In the other sub-sectors - equipment, content and computer services - the fact that Canada's borders are relatively open tends to ensure that the customer gets the combination of quality and cost which he wants, or at least that he is no more disappointed than his counterparts in other countries. However, in many product lines, the cost, quality and selection of goods and services produced within Canada itself is much less satisfactory.

Economic Trends

1. Historical

The output of the communications/information sector has grown rapidly in real terms over the past decade, and at a substantial if less spectacular rate in dollar terms. Exhibit 9-2 overleaf shows that the most rapid growth has been in computer services and cable television, with radio and television manufacturers and cinemas faring the worst. The differences in growth rates generally conform to the concept of a product life cycle, though there are anomalies such as the rapid growth of firms which engage only in publishing (not printing). This may well be due to the inclusion of Harlequin in that category.

Trends in employment have differed significantly from those in output, as Exhibit 9-3, following, demonstrates. In particular, employment has declined in the equipment sub-sector because of technological changes in both products and processes.

EXHIBIT 9-2COMMUNICATIONS/INFORMATION SECTORGrowth in Operating Revenues
by Industry

Computer Services	25.0%	(1974-79)
Cable TV	21.5%	(1970-79)
Publishing Only	19.4%	(1970-79)
Film Distributors	16.7%	(1975-79)
Office and Store Machinery Manufacturers	15.8%	(1970-80)
Sound Recording	15.6%	(1970-80)
Broadcasters	14.7%**	(1970-79)
Telephone	14.4%	(1970-80)
Post Office	14.3%*	(1970/71-79/80)
Communications Equipment Manufacturers	13.1%	(1970-80)
Other Telecommunications	13.1%	(1970-79)
Film and Videotape Production	12.1%	(1975-79)
Printing and Publishing	10.9%	(1970-79)
Sales and Rental of EDP Hardware	8.7%	(1974-79)
Cinemas	7.1%	(1975-79)
Radio and TV Manufacturers	3.6%	(1970-80)

Percentages are arithmetic means of year-over-year percentage increases.

* Total costs including deficit paid by government.

** Includes parliamentary appropriations for CBC.

EXHIBIT 9-3COMMUNICATIONS/INFORMATION SECTORGrowth in employment
by Industry

Cable TV	12.2%	(1970-79)
Computer Services	10.0%	(1974-79)
Publishing Only	7.1%	(1970-79)
Film and Videotape Production	6.5%	(1975-79)
Post Office	4.1%	(1970/71-79/80)
Broadcasting	3.9%	(1970-79)
Telephone	3.9%	(1970-79)
Printing and Publishing	1.9%	(1970-79)
Sales and Rental of EDP Hardware	0.2%	(1974-79)
Other Telecommunications	- 0.6%	(1970-79)
Office and Store Machinery	- 0.9%	(1970-79)
Communications Equipment	- 2.0%	(1970-78)
Household Radio & TV Equipment	- 7.9%	(1970-79)
Cinemas	N/A	
Film Distributors	N/A	
Sound Recording	N/A	

Percentages are arithmetic means of year-over-year percentage increases.
N/A Not available.

2. Information economy

We tend to be cautious about prophecies of a coming "information economy", "information revolution" or "third wave", despite the enthusiasm of a variety of authors, ranging from Toffler and Servan-Schreiber to the Clyne Committee. One reason is that such proclamations imply some sort of discontinuity. In fact, the communications/information sector was a major contributor to the Industrial Revolution and to subsequent development. The role of transport - waterways, railways and ultimately highways and airways - to the opening up of the broad markets and raw material sources required by large scale industry is obvious. The contribution of better communications - printing, postal service, the telegraph, the telephone, not to mention equipment such as the cash register - to the broadening of markets, the development of large organizations and the education of the labour force is less obvious, but undeniable.

The recent growth in the importance of the communications/information sector represents a continuation of this trend. Among the key factors are:

- the increasing size, complexity and geographical scope of businesses and public institutions. This development has led to greater needs to process, compile and transmit information within organizations, to communicate with the outside world and to keep posted on external events;
- the growing importance of governments and financial institutions, whose operations involve a great deal of information processing;
- growing leisure time and discretionary income, which have stimulated public demand for information products and services;
- rising education levels; and
- the declining real cost and increasing performance of electronic equipment, and thus of capital-intensive services such as telecommunications. This change opens up a steadily increasing range of applications for computers and related technologies.

Declining equipment costs are one point where parallels to the Industrial Revolution are interesting. Technological improvements in that period produced dramatic decreases in the cost of manufactured materials such as cotton, steel and sulphuric acid, opening the way for new applications, dramatically larger volumes and increased living standards generally.*

It is also commonly argued that service activities, including offices, have grown as a proportion of total employment because labour productivity in these activities has not grown as dramatically as in agriculture and manufacturing. The equipment sub-sector is seen as serving this new frontier of mechanization through increasingly sophisticated data processing, word processing and communications systems. Videotex is also seen as having the potential to replace certain aspects of bank and retail operations. At the same time, robotics, another aspect of electronics, may further increase productivity in manufacturing. If this view is correct, communications/information and related equipment will play a critical role in extending growth in productivity, and therefore in living standards. In this, as in other respects, the economic significance of the sector goes far beyond its own revenues and employment.

3. Specific future trends

Many of the trends evident during the past decade are likely to remain strong through the 80's. These include continued rapid growth in demand for:

- business telecommunications, partly because of the rising cost and inconvenience of business travel. This may include demand for new services such as teleconferencing, store-and-forward "voice mail" systems and "electronic mail" message and record transmission services using word processors or computer terminals. Some existing specialized services such as international telephone and mobile telephone will also continue to grow very rapidly. But the bulk of the increase will probably be accounted for by conventional long-distance voice traffic;

* Samuel Lilley, "Technological Progress and the Industrial Revolution", in volume 3 of the Fontana Economic History of Europe. The price of sulphuric acid, for example, dropped by a factor of a hundred from 1736 to 1749.

- electronic information services, particularly for business use, although some home demand is developing as personal computers become more common;
- alternative channels for audio-visual content, including pay television, videocassette and possibly videodisc and direct broadcasting by satellite;
- EDP and office automation equipment, particularly lower-cost models used either in smaller organizations or on a decentralized basis in large ones;
- application software, including packages; and
- microprocessor - based "electronic games", including home computers or Talidon-type systems used largely for entertainment.

In other areas, there may be some slowdown in growth rates. These include:

- mail volume, due to price increases and the growth of alternative services;
- the number of telephones in service, because of market saturation and slower growth in employment and the number of households; and
- personal long-distance telephone calls, because of pressure on discretionary incomes and decreased geographical mobility.

These are also new opportunities which may lead to major requirements for equipment, software and carriage services. These are in the areas of:

- transaction services for the home market, such as tele-shopping, tele-banking and travel reservations, which may be combined with information retrieval services; and
- integrated office systems, or "the office of the future", which may consist of an integrated network of word processors, computers, photocopiers, facsimile machines, etc., all linked together and to other offices through a sophisticated switchboard.

There are other systems which appear further off in terms of technical feasibility, let alone commercial viability, but whose potential is very interesting. These include:

- more extensive voice output from computers, either alone or in combination with text or images;
- voice recognition capability for computers or word processors, so that it could eventually be possible to produce a draft text directly from dictation;
- more flexible optical character recognition capability;
- greater capability for computers to reason or learn independently, rather than having to be programmed in meticulous detail by human beings.

4. Areas for research

The purpose of this study was to provide an overview of the current state of the sector and the trends likely to affect it during the decade of the 80s. In carrying out our work, we have been struck by the degree of uncertainty as to the technical, and particularly the economic, viability of alternatives. To some extent, this uncertainty can only be resolved through the continuing process of product development, through field trials and the eventual attempt at commercial introduction. However, a sound economic development policy would be greatly aided by whatever insight can be gained into:

- the institutional arrangements necessary to provide reasonable protection for both consumer and business interests in transaction systems such as electronic funds transfer or tele-banking, tele-shopping or travel reservations, and their impact on the cost of such systems and the time required to develop and implement them;
- the probable operating cost of such transaction systems compared to conventional alternatives such as cheques, catalogue shopping by mail or telephone and the use of travel agents;
- the probable sales impact of such transaction systems, i.e. will impulse buying be more or less common if people shop via home terminals rather than in person;

- consumer readiness to use such systems, i.e. will the convenience and possible cost savings of electronic systems be sufficient to outweigh their unfamiliarity and the loss of social contact;
- the number and proportion of business activities where the interconnection of various types of equipment would be a significant advantage;
- the probable relative cost of integrated as opposed to stand-alone systems, e.g. is it really more economic to have a word processor linked to a copier so that it can transmit text directly, rather than having the word processor print an original to be fed into the copier or, as a compromise solution, produce a diskette which the copier could read;
- the probable relative cost of managers interacting directly with sophisticated office equipment compared to using support staff, e.g. learning to edit a text at a word processor rather than having a secretary do it. These questions must be addressed in terms of comparative advantage, quite apart from the sociological barriers which might have to be overcome;
- the probable relative cost of different carriage media (paired wires, coaxial cable, fibre optic cable, satellite transmission, physical delivery, and so forth) for different types of traffic individually and for different groupings of services. These questions should be addressed in terms of both local and long-distance traffic;
- the technical feasibility of moving from the present architecture of carriage systems to a new architecture which might be more attractive in the long run given the carriage media and switching systems now available and the services which may be provided;
- the probable relative cost and market appeal of various methods of transmitting audio-visual material, such as conventional broadcasting, pay television, cable-satellite systems, direct broadcasting by satellite, videocassette rental or purchase, and videodisc rental or purchase. The purpose would be to identify:
 - which methods are dominated by others, or in other words, which are likely to be more expensive without any significant service advantage; and

- which methods may be attractive only for specific markets, either geographic or in terms of the type of material.

There is also a role for research, whether sponsored by government or industry, on opportunities in the general field of content. Topics which might be addressed include:

- the actual and potential size and Canada's current position in various "niches" in worldwide content markets other than high-cost mass-appeal entertainment. Areas to be studied might include programming and books for children, how-to-do-it material, scientific subjects and language learning;
- market opportunities in software for home computers, including educational, as well as entertainment applications; and
- potential new applications for electronic information services, particularly in business markets.

5. Statistical information requirements

While the absence of statistics on existing activities should not be used as an excuse for inaction, it certainly makes policy development more of a "hit or miss" affair. The communications/information sector is an area where the statistics tend to be weak because:

- its outputs have evolved rapidly, tending to leave behind systems of classification which have to maintain some continuity;
- many of its outputs are difficult to value, in part because of the importance of development or fixed costs rather than marginal costs;
- domestic production is often small, which can lead to problems with the confidentiality of data; and
- it has not had priority in the statistical system, presumably because of the relatively small size of Canadian production, the cultural rather than economic emphasis of policy development, and the difficulties of measurement.

We are particularly concerned about the absence or inadequacy of data on:

- international trade, particularly in "soft" areas such as television programs, films, masters for sound re-cording, computer software and data processing services;
- data processing and systems development activities within companies, including the extent of dependence on foreign parent companies;
- international price comparisons for carriage services based on a "market basket" representative of Canadian demand; and
- total sales, lease and rental volume by type of equipment for all industries within the equipment sub-sector.

X - POLICY IMPLICATIONS

Why Government Involvement?

To say that there should be an economic development strategy for a sector implies that:

- the development of that sector has some significance;
- it is unlikely to proceed satisfactorily without government involvement; and
- there is a reasonable probability that such action will be successful.

In Chapter 3, we pointed out that the economic significance of the communications/information sector rests primarily on the fact that it is a critical part of the economic infrastructure, but in a much broader sense than the word is usually given. This infrastructure role includes:

- carriage activities such as telecommunications and postal service, which are essential to the co-ordinated operation of business enterprises and governmental bodies on a regional, national and international level;
- the provision of EDP and office automation equipment and related software, which are more and more an integral part of business operations, extending well beyond the accounting function. Microelectronic technology is also playing an increasing role in design, manufacturing and as an element of a wide variety of end products;
- the media used for advertising, which is essential to the functioning of a complex, mass-production economy;
- the production of content, particularly books, which are vital to the basic and continuing education of a sophisticated labour force.

It should, however, be recognized that the very efficiency of the sector means that its employment and the dollar value of its output are a substantial, but not overwhelming, proportion of national totals. Moreover, economic linkages to supplier industries, other than those like equipment which are included within the sector, are relatively minor. Paper for publishing and wire and cable for telephone systems are exceptions, but in most of the sector the key inputs are skilled labour and capital, not materials.

Another reason why the communications/information sector should be of concern to economic policy makers is that Canada's trade deficit in the sector is already \$2.7 billion, a major factor in the total trade deficit of \$3.2 billion in 1980. Our generally disappointing record, and the fact that other national governments and multinational corporations are taking a very active interest in the sector, suggest that our trade performance will continue to be poor unless government takes an active role. On the other hand, our record of innovation and our international successes, however isolated, suggest that Canada can compete, at least on a selective basis.

Another reason for the federal government to be concerned about the economic development of the communications/information sector is that it is already spending \$1.8 billion on a wide variety of programs in the sector. The analysis of these programs later in this chapter shows that this spending is oriented much more to social and cultural objectives, rather than economic development. One question this raises is whether this allocation really reflects present priorities, or simply the cumulative effect of past decisions. Another issue is whether the economic development of the sector could indirectly facilitate the achievement of some of these social and cultural objectives.

Existing Programs

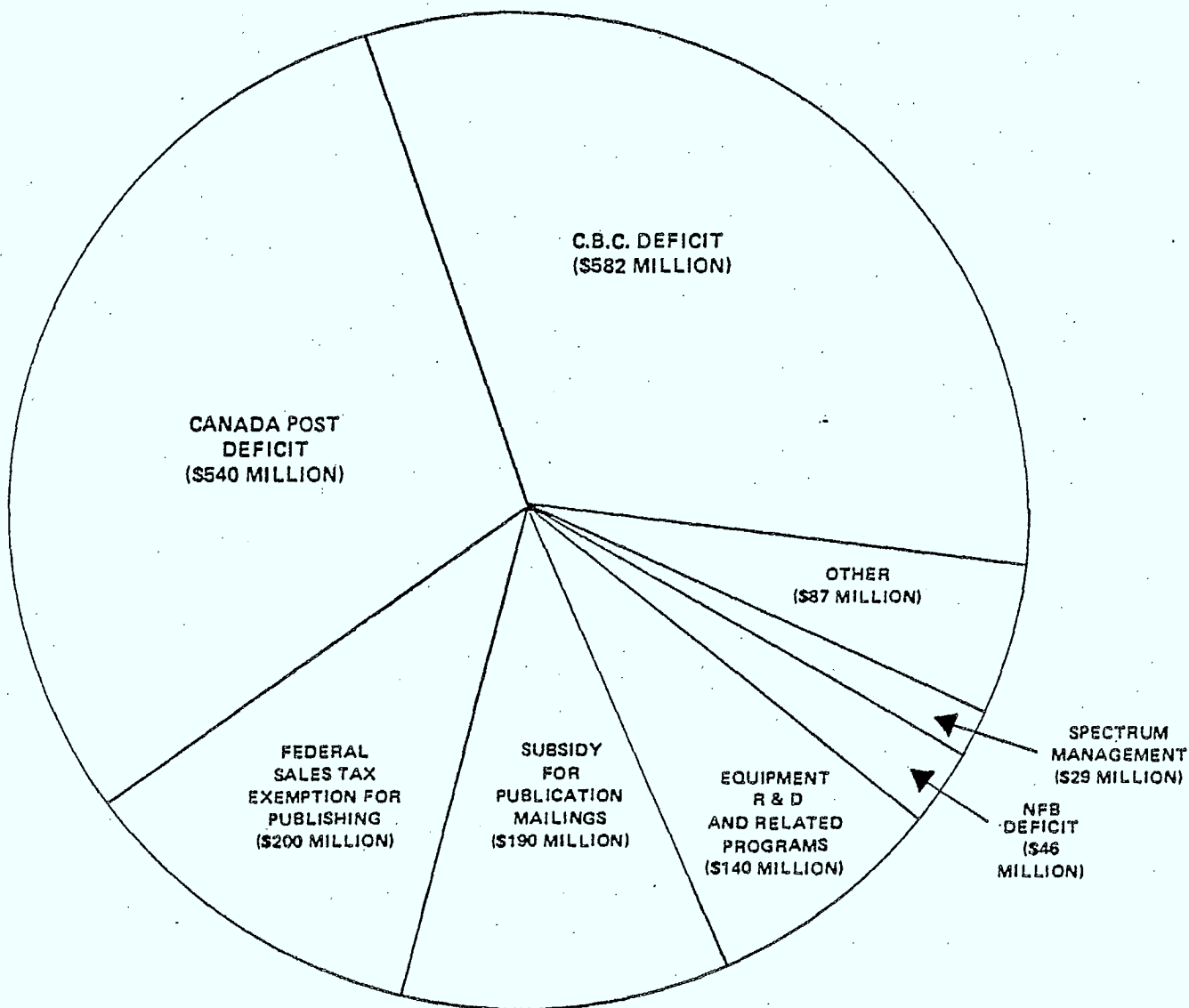
Governments are already deeply involved in many aspects of the communications/information sector as regulators, owners, and providers of incentives. These interventions differ widely in their objectives, the types of instruments used and the resources devoted to them. To gain a more coherent overview of programs, particularly at the federal level, we developed a classification system whose results are shown on Appendix D. Some of the conclusions which arise from a review of this matrix are:

- a wide range of federal government agencies are involved with the sector. These include the CRTC, the Department of Communications, the Department of Industry, Trade and Commerce (in relation to equipment), the Department of Finance (for tax measures), the Department of Consumer and Corporate Affairs (for copyright and patent legislation) and Crown corporations such as the CBC, National Film Board, Canada Post, National Library and Canadian Film Development Corporation. The Ministries of State for Economic Development and for Science and Technology are also concerned with the sector;
- until recently, federal government involvement has focussed on the content and carriage sub-sectors. Involvement in equipment has increased in recent years, but in computer services it remains minor;
- provincial governments also have a major role as the telecommunications regulatory authorities in most provinces, as owners of carriers and educational television networks, through their influence over schools and libraries, and so forth;
- economic development of the sector, in the sense of establishing enterprises which will be self-sustaining financially without ongoing support or protection, has not been a primary objective for most programs, particularly in the content sub-sector;
- financial resources have been focussed on mature rather than growing parts of the sector. Specifically, subsidies to the CBC, Canada Post, and to the publishing industry through postal rates and tax exemptions have accounted for the lion's share of federal expenditures in the sector. As Exhibit 10-1 overleaf illustrates, only a small fraction of the \$1.8 billion the federal government planned to devote to the sector in 1981/82 was seed money for growth industries which are expected to become self-sustaining;

EXHIBIT 10-1

FEDERAL GOVERNMENT SPENDING
IN COMMUNICATIONS/INFORMATION SECTOR
1981/82 ESTIMATES

TOTAL = \$1,814 MILLION



Source: Calculations made by Price Waterhouse, based in most cases on 1981/82 estimates.

- measures to encourage content production have tended to focus on distribution, both by ensuring that broadcasters provide air time for Canadian productions and that they have the financial resources to devote to it.

Some Recurring Themes

In the preceding chapters, we set out the issues which we see on a subsector by sub-sector basis. However, there are five themes whose importance crosses sector boundaries. These are discussed below.

1. Rationalization/competition

We do not see any single answer as to the degree of concentration which is appropriate in this sector. There are parts of the sector where international trade is a major factor, such as telecommunications equipment, EDP and other office automation equipment, program production and book publishing. In these industries, imports will always provide a choice for consumers, and one would therefore incline to a policy of rationalization to create a few Canadian-based companies which have the scale and the financial strength to invest in research and development, to sell aggressively on a world scale and to produce efficiently.

Smaller companies may tend to be more creative, either technically or artistically, and may be able to succeed for a time in a particular market niche. To prosper in the long term, however, they will generally have to either grow and broaden their product line, or be bought up by larger firms. They are also likely to require more intensive step-by-step support from government, rather than being able to "take the ball and run with it".

One alternative is simply to leave rationalization to the market place, subject perhaps to limitations on foreign takeovers. To the extent that the government provides any form of selective assistance to the sector, however, it will have to decide who is to receive it. To say that decisions will be made on a case-by-case basis is to ignore the need for some general principles which can be referred to in making those decisions.

There are other parts of the sector where trade is much less of a factor, particularly in carriage. In these industries, the general principle would seem to be to encourage greater competition to ensure that customer needs are met effectively and at minimum cost. However, the application of such a philosophy is complicated because a single network may be far more economical in certain contexts, and because of existing practices such as cross-subsidization. Moreover, new services such as videotex involve major requirements for content, equipment and software, so that trade considerations do have some relevance.

2. Picking winners

In any situation where broad stimulative measures seem likely to be either insufficient or overly costly, discussion of economic development policy inevitably comes back to the need for government to select a limited number of "winners", be they products, product lines or firms, on which it will concentrate its support. There is also a tendency to feel that, in new product lines which appear to have natural monopoly characteristics, an impartial arbiter such as the government should step in to avoid wasteful jockeying for the market and to ensure that a potentially lucrative new industry does not "fall into the wrong hands".

However, picking winners in this sector is extremely difficult. There is a great deal of uncertainty about the technological feasibility, long-term cost and market acceptance of new products, despite the aura of certainty which their promoters may project. Selection of content with market appeal is far from easy either. A partial answer is that government should not commit too large a proportion of its resources to any one project, and should review its commitments periodically.

There is also a very real danger that, despite good intentions, the choices made by government will be influenced:

- more by technological glamour than real market prospects;
- more by perceived social and cultural benefits and problems than commercial feasibility; and

- more by politically influential vested interests, or newcomers with a politically attractive story, than by the needs of the economy.

Policy makers must be constantly on guard against these risks.

Governments are also faced with the political and ethical problem that in picking winners they may be conferring an undue benefit on certain firms or individuals. However, this is more a matter of structuring arrangements so that government shares in the rewards as well as the risks.

One possible approach is to fund research and development efforts on a fairly broad basis, provided that the product is reasonably credible, but to restrict assistance in marketing and production start-up to firms which have a track record of commercial success or can demonstrate their ability to attract capital from other sources as well.

3. Multinationals/Canadian firms

The question of whether to rely on multinationals or on Canadian-based firms for the development of the sector is also difficult. The track record of multinationals in the sector is not encouraging. In most of the equipment sub-sector and in content, their Canadian operations have been oriented more to distribution than production, let alone development. IBM is one of the few companies to have respected the "rationalization" policy of the Department of Industry, Trade and Commerce, but even it has done so by manufacturing relatively low technology products such as typewriters in Canada to offset imports of mainframe computers.

On the other hand, there would be significant advantages if the Canadian subsidiaries of multinational corporations were able to obtain genuine world product mandates covering research and development, as well as manufacturing for specific high technology products or product lines in Canada. We could then benefit from the multinational's reputation, worldwide marketing network, financial strength and its research and development in related

areas. The question is whether it is realistic to expect full responsibility for new product lines critical to a firm's future to be delegated to the Canadian subsidiary? Moreover, can we rely upon such delegation to continue?

We should also be realistic enough to see that Canadian-based firms which succeed in export-oriented industries are likely to establish substantial facilities outside the country, becoming multinationals themselves. This may be in response to advantages either in marketing or costs of production and distribution. Canada can hope for continuing economic benefits from head office and development activities, but it cannot expect that the full process will remain here.

Despite these considerations, the general rule should be to focus support on Canadian-based companies and to maintain Canadian control over emerging firms. This approach provides greater assurance that technology developed in Canada will be applied to manufacture products here. In content production, it provides greater assurance that efforts will be made to develop and market content of Canadian origin. Opportunities for mutually beneficial collaboration with multinationals should not, however, be excluded.

4. Protection

Protection of the Canadian market for most communications/information products and services is not a viable approach because:

- we cannot afford to deny Canadian business users access to critical technology at competitive prices;
- Canadian consumers are accustomed to having a broad choice of expensively-produced content, and would not accept limitations on the choice available; and
- in some sectors, such as computer processing and software packages, traditional protective measures such as tariffs and quotas would be extraordinarily difficult to enforce for technical reasons.

Policy must therefore focus in most cases on strengthening Canadian industry so that it can compete more effectively, rather than protecting it.

5. Specialization

Another fundamental constraint, which flows from the fact that Canada is a relatively small factor in a worldwide or North American market, is that we must specialize in order to succeed. High up-front costs for research, development, marketing and production start-up give large-scale operations an important advantage. A small country can only achieve this scale if it has industries which are specialized, export oriented and generally outside the areas in which major countries have already established a strong position.

** ** **

A wide variety of issues pertaining to specific sub-sectors and industries are discussed in sections beginning on the following pages:

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Content		119
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INTERVIEWS

Carriage

- R. Coleman, Director General; J. Deacon, Director, Legislative Policy and other representatives of Bell Canada
- J. Halina, Executive Director, Cable Telecommunications Research Institute
- P. Hébert, Vice-Président, Marketing, Cablevision Nationale
- M. Hind-Smith, President, Canadian Cable Television Association
- H. Nightingale, Director, Marketing Planning, Canada Post
- B. O'Neil, Director, Market Research and Development, Telesat Canada
- J. Schmidt, Vice-President, Regulatory Affairs; G. Carleton, Vice-President, Marketing and A. Manson, Director, Accounts and Control, CNCP Telecommunications

Content

- R. Besse, President, Gage Publishing
- D. Carlisle, President and G. Bloxam, Vice-President Canadian Sales, Infomart
- J. Coleman, Vice-President, Planning and B. Parkes, Vice-President, Finance, C.T.V.
- P. Desbarats and P. Oliphant, Consultants, Royal Commission on Newspapers
- C. Durance, Director, Network Project, National Library
- P. Ferns, Vice-President, Neilsen and Ferns
- L. Hodgkinson, Publisher, Consumer Magazines, Maclean Hunter
- G. Laberge, General Manager, Bordas Dunot Montréal
- J. McCann, Director, Policy and Planning, Canadian Film Development Corporation
- J. Schewbridge, Assistant Vice-President, Planning, Canadian Broadcasting Corporation

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Equipment

- L. Barton, Vice-President, Mitel
- J. Feeney, Manager, Business Development and Planning, Canada Development Corporation
- R. Long, Executive Director, Canadian Advanced Technology Association
- G. Murray, Vice-President and R. Logan, Director, External Programs IBM Canada
- W. Walters, Vice-President Public Relations, Northern Telecom

Computer services

- G. Lucas, Vice-President, Data Crown
- I. Sharp, President, I.P. Sharp

We also wish to thank the various officials of the Department of Communications who met with us, as well as the consultants from various specialities within our own firm who provided input.

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INFORMATION PRODUCT AND SERVICE FLOWS

From \ To	Households	Business Generally	Carriage	Content	Equipment	Computer Services
Households	(. personal letters) (. personal telephone calls) (. classified ads)	(. enquiries) (. orders) (. payment of invoices) (. complaint letters/calls)	(. community channel participation)	(. letters to editor) (. phone-in participation)		
Business Generally	(. direct mail advertising) (. telephone sales) (. television ads) (. radio ads) (. newspaper ads) (. magazine ads) (. invoices)	(. direct mail advertising) (. telephone sales) (. enquiries) (. orders) (. payment of invoices) (. other business messages) (. surplus computer capacity) (. specialized application software)		(. news releases)		
Carriage	(. rental/sale of telephones) (. local telephone service) (. long distance telephone service) (. directory listings) (. directories) (. local mail) (. long distance mail) (. cable delivery of TV and fm radio broadcasts) (. community channel programming) (. simple teletext via cable)	(. rental/sales of telephones and PBX's) (. local telephone service) (. long distance telephone service) (. directory listings, incl. yellow pages) (. directories) (. data transmission) (. facsimile transmission) (. Telex/TWX equipment and service) (. network interface equipment) (. mobile telephone service) (. paging service) (. mailing lists) (. local mail) (. long distance mail) (. local messenger service) (. long distance messenger service) (. telepost)	(. delivery of telegrams via telephone) (. delivery of telegrams via mail) (. telepost delivery) (. satellite transmission of voice and data) (. access to local loops - Bell to CNCP) (. mail delivery of telephone bills)	(. long distance transmission of programs and news items) (. transmission of news service copy incl. photos) (. satellite transmission for remote printing of newspapers) (. mail delivery of cable bills) (. mail delivery of periodicals) (. periodical subscription correspondence) (. direct mail sale and delivery of books) (. telephone sale of newspaper subscriptions) (. delivery of electronic publishing services)		(. data transmission)

Note: Flows shown in brackets are those where the entity receiving the product or service does not pay for it directly, for example television broadcasts.

From	To	Households	Business Generally	Carriage	Content	Equipment	Computer Services
Content		<ul style="list-style-type: none"> pre-recorded video-tapes or discs records pre-recorded audio tapes (. tv broadcasts) (. radio broadcasts) (. program guides) cinema admissions books subscriptions to newspapers and periodicals single copies of newspapers and periodicals classified ad audiences (. controlled circulation periodicals) (. library book loans) (. library film loans) (. library access to reference books, newspapers, periodicals, audio recordings) home study courses textbooks bibliographic services abstracting services 	<ul style="list-style-type: none"> training and publicity films and videotapes audio/visual instruction materials for schools tv ad audiences radio ad audiences newspaper ad readership periodical ad readership subscriptions books loose leaf services trade directories news clippings and similar retrievals current news service home study instruction of personnel bibliographic services mailing lists rentals 	<ul style="list-style-type: none"> ads for long distance and other services (. tv and fm radio broadcasts to cable systems) 	<ul style="list-style-type: none"> movie sound tracks for record/tape production dubbing of audio/visual programs in other languages versioning of programs for different markets studio rentals by broadcasters to independent producers (. radio air time for records) audio/visual production rights (. newspaper/periodical reviews and coverage of records) audio/visual programs to tv stations and cinemas (. records supplied to broadcasters) (. tv promotion of coming programs) (. cinema promotion of coming films) tv and radio ads for films program guides (. newspaper/periodical reviews and coverage of films and tv programs) newspaper ads for films and tv programs (. program information) (. cinema admissions for reviewers) tv ads for newspapers book rights to audio/visual productions (. interviews with authors) magazine excerpts of books library book purchases wire service copy copy for news clipping and similar services (. books to newspapers/periodicals for review) 	<ul style="list-style-type: none"> tv ads for equipment periodical ads for equipment 	<ul style="list-style-type: none"> periodical ads for software and services

From	To	Households	Business Generally	Carriage	Content	Equipment	Computer Services
					<ul style="list-style-type: none"> • subsidiary rights for translation/adaptation • periodical ads for books • book reviews in newspapers/periodicals) 		
Equipment		<ul style="list-style-type: none"> • telephone sales • telephone answering equipment • typewriters • calculators • microcomputers • radio receivers • television receivers • videotape recorders and players • audio tape recorders and players • GRS and amateur radio equipment 	<ul style="list-style-type: none"> • telephone and PBX sales • telephone answering equipment • mobile radio equipment • mainframes • minicomputers • microcomputers • terminals • printers • systems software • application packages • custom programming • automated teller machines • point of sale equipment • typewriters • word processors • facsimile equipment • copiers • microform equipment • cash registers • calculators • dictation equipment • filing cabinets • printing and graphics equipment 	<ul style="list-style-type: none"> • telephones and PBX's • switching and network control equipment • telex/TWX terminals • mobile radio and paging equipment • mail encoding and sorting equipment • satellites • earth stations • microwave transmission equipment • cable head end equipment, trunks and drops 	<ul style="list-style-type: none"> • cameras and other production equipment • computer editing equipment • broadcasting equipment • library cataloguing and circulation control equipment • text editing and composing equipment • printing and graphics equipment 	<ul style="list-style-type: none"> • mainframes, terminals, printers and systems software for service bureau operations • minicomputers etc. for OEM's 	
Computer Services		<ul style="list-style-type: none"> • microcomputer application packages 	<ul style="list-style-type: none"> • batch and interactive processing time • use of specialized software • access to computer-based information services • systems software • application packages • custom programming • hardware/software packages 				<ul style="list-style-type: none"> • custom software for service bureaus

To From	Households	Business Generally	Carriage	Content	Equipment	Computer Services
	Related Services	<ul style="list-style-type: none"> . invitations and other custom printing . printing of publicity, training and other material . business forms . printing of catalogues . circulation statistics . audience ratings . advertising creative services . advertising booking 	<ul style="list-style-type: none"> . directory printing 	<ul style="list-style-type: none"> . printing, binding, typesetting, etc. 		

Appendix D

[REDACTED]

CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

		COST
Federal government expenditures 1981/82 (\$ millions)		
Other		
Cultural		
Social Equity		
Economic Sovereignty		
Infrastructure at reasonable cost		
Orderly Market		
Stimulating Demand	X	
Capital	X	
Human Resources		
Production/Procurement		
Marketing/Distribution		
Technology		
International Agreement		
Persuasion/Information		
Tax Incentives/Disincentives		
Subsidies		
Government Purchasing		
Government Quasi-Commercial Activity	X	
Government Service Free of charge		
Patent/Copyright Protection		
Rate Regulation		
Control over Entry/Use	X	
Legal Requirement/Prohibition		
Provincial/Local		
Other Federal Dept.		
Federal Crown Corp./Agency		
CRTC		
Dept. of Communications		
GOVERNMENT PROGRAMS (BY COMPONENT)		
CARRIAGE (continued):		
- substitution of local stations on cable	X	
- cable signal carriage priority	X	
- cable hardware ownership policies	X	
- voluntary compensation of broadcasters by cable	X	
. terminal attachment program certification	X	
. limitations on earth station licensing	X	
. preference to common carriers in microwave licensing	X	
. Northern Communications Assistance Program	X	
. management of the radio frequency spectrum (cost includes a portion of departmental overhead but is net of associated revenues)	X	

FRAMEWORK STUDY

CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

Appendix D
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DEPARTMENT OF COMMUNICATIONS

FRAMEWORK STUDY

CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

GOVERNMENT PROGRAMS (BY COMPONENT)	AGENCY	TYPE OF INSTRUMENT												OBJECTIVE										COST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	Dept. of Communications	CRTC	Federal Crown Corp./Agency	Other Federal Dept.	Provincial/Local	Legal Requirement/Prohibition	Control over Entry/Use	Rate Regulation	Patent/Copyright Protection	Government Service Free of charge	Government Quasi-Commercial Activity	Government Purchasing	Subsidies	Tax Incentives/Disincentives	Persuasion/Information	International Agreement	ECONOMIC DEVELOPMENT OF SECTOR					OTHER OBJECTIVES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
																	Technology	Marketing/Distribution	Production/Procurement	Human Resources	Capital	Stimulating Demand	Orderly Market	Infrastructure at reasonable cost	Economic Sovereignty	Social Equity	Cultural	Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

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DEPARTMENT OF COMMUNICATIONS
FRAMEWORK STUDY
CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

	COST	OBJECTIVE									
		ECONOMIC DEVELOPMENT OF SECTOR					OTHER OBJECTIVES				
		Technology	Marketing/Distribution	Production/Procurement	Human Resources	Capital	Stimulating Demand	Orderly Market	Infrastructure at reasonable cost	Economic Sovereignty	Social Equity
GOVERNMENT PROGRAMS (BY COMPONENT)	Federal government expenditures 1981/82 (\$ millions)										
	Other										
	Cultural										
	Social Equity										
	Economic Sovereignty										
	Infrastructure at reasonable cost										
	Orderly Market										
	Stimulating Demand										
	Capital										
	Human Resources										
	Production/Procurement										
	Marketing/Distribution										
	Technology										
	International Agreement										
EQUIPMENT (continued): • Supply and Services fund for unsolicited proposals	Persuasion/Information										
	Tax Incentives/Disincentives										
	Subsidies										
	Government Purchasing										
	Government Quasi-Commercial Activity										
	Government Service Free of charge										
	Patent/Copyright Protection										
	Rate Regulation										
	Control over Entry/Use										
	Legal Requirement/Prohibition										
	Provincial/Local										
	Other Federal Dept.										
	Federal Crown Corp./Agency										
	CRTC										
	Dept. of Communications										

DEPARTMENT OF COMMUNICATIONS

FRAMEWORK STUDY

CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

GOVERNMENT PROGRAMS (BY COMPONENT)	AGENCY	TYPE OF INSTRUMENT	OBJECTIVE		COST Federal government expenditures 1981/82 (\$ millions)
			ECONOMIC DEVELOPMENT OF SECTOR	OTHER OBJECTIVES	
			International Agreement		
			Persuasion/Information		
			Tax Incentives/Disincentives		
			Subsidies		
			Government Purchasing		
			Government Quasi-Commercial Activity		
			Government Service Free of charge		
			Patent/Copyright Protection		
			Rate Regulation		
			Control over Entry/Use		
			Legal Requirement/Prohibition		
			Provincial/Local		
			Other Federal Dept.		
			Federal Crown Corp./Agency		
			CRTC		
			Dept. of Communications		
CONTENT:					
• production of educational TV programming					-
• 100% CCA for films or video productions	X				17*
• Canadian Film Development Corporation					4
• CBC program costs (cost includes a portion of overhead but is net of miscellaneous revenues)	X				549
• National Film Board production (cost includes a portion of overhead but is net of associated revenues)					31
• National Film Board research and development					1
• CRTC legislation and regulatory activities:					16
- licensing of broadcasters	X				
- Canadian ownership of broadcast licensees	X				

* Dept. of Finance estimate of gross cost for 1979.

DEPARTMENT OF COMMUNICATIONS

FRAMEWORK STUDY

CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

GOVERNMENT PROGRAMS (BY COMPONENT)	AGENCY	TYPE OF INSTRUMENT	OBJECTIVE		COST Federal government expenditures 1981/82 (\$ millions)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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						Other	Cultural	Social Equity	Economic Sovereignty	Infrastructure at reasonable cost	Orderly Market	Stimulating Demand	Capital	Human Resources	Production/Procurement	Marketing/Distribution	Technology																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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DEPARTMENT OF COMMUNICATIONS

FRAMEWORK STUDY

CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

GOVERNMENT PROGRAMS (BY COMPONENT)	AGENCY	TYPE OF INSTRUMENT	OBJECTIVE											COST Federal government expenditures 1981/82 (\$ millions)			
			ECONOMIC DEVELOPMENT OF SECTOR	OTHER OBJECTIVES													
				Technology	Marketing/Distribution	Production/Procurement	Human Resources	Capital	Stimulating Demand	Orderly Market	Infrastructure at reasonable cost	Economic Sovereignty	Social Equity		Cultural	Other	
CONTENT (continued):																	

FRAMEWORK STUDY

AGENCY	TYPE OF INSTRUMENT	OBJECTIVE		COST
		ECONOMIC DEVELOPMENT OF SECTOR	OTHER OBJECTIVES	
		Other		
		Cultural		
		Social Equity		
		Economic Sovereignty		
		Infrastructure at reasonable cost		
		Orderly Market		
		Stimulating Demand		
		Capital		
		Human Resources		
		Production/Procurement		
		Marketing/Distribution		
		Technology		
		International Agreement		
		Persuasion/Information		
		Tax Incentives/Disincentives		
		Subsidies		
		Government Purchasing		
		Government Quasi-Commercial Activity		
		Government Service Free of charge		
		Patent/Copyright Protection		
		Rate Regulation		
		Control over Entry/Use		
		Legal Requirement/Prohibition		
		Provincial/Local		
		Other Federal Dept.		
		Federal Crown Corp./Agency		
		CRTC		
		Dept. of Communications		
GOVERNMENT PROGRAMS (BY COMPONENT)				
CONTENT (continued):				
. excess of costs allocated to publication mailings over revenues to Canada Post				
. federal sales tax exemption for publishing (cost is lower bound of estimate by officials)				
. operation of libraries (cost - National Library only)				

DEPARTMENT OF COMMUNICATIONS

FRAMEWORK STUDY

CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

	AGENCY	TYPE OF INSTRUMENT	OBJECTIVE		COST
			ECONOMIC DEVELOPMENT OF SECTOR	OTHER OBJECTIVES	
GOVERNMENT PROGRAMS (BY COMPONENT)			Other		Federal government expenditures 1981/82 (\$ millions)
			Cultural		
			Social Equity		
			Economic Sovereignty		
			Infrastructure at reasonable cost		
			Orderly Market		
			Stimulating Demand		
			Capital		
			Human Resources		
			Production/Procurement		
			Marketing/Distribution		
			Technology		
			International Agreement		
			Persuasion/Information		
		Tax Incentives/Disincentives			
		Subsidies			
		Government Purchasing			
		Government Quasi-Commercial Activity			
		Government Service Free of charge			
		Patent/Copyright Protection			
		Rate Regulation			
		Control over Entry/Use			
		Legal Requirement/Prohibition			
		Provincial/Local			
		Other Federal Dept.			
		Federal Crown Corp./Agency			
		CRTC			
		Dept. of Communications			
COMPUTER SERVICES:					
• contracting out of data processing				X	1
• assistance to software houses under Enterprise Development Program				X	2
• accelerated depreciation on EDP equipment				X	2

DEFINITIONS FOR
CLASSIFICATION OF EXISTING GOVERNMENT PROGRAMS

Type of Instrument

Legal Requirement/Prohibition - a requirement established by law or regulation and applying to all of those engaged in a particular activity.

Control over Entry/Use - licensing and conditions enforced through the licensing process, generally involving the exercise of some discretion by regulatory body.

Rate Regulation - control by a regulatory body over rates and related terms and conditions of service, regardless of whether an explicit rate of return criterion is applied.

Patent/Copyright Protection - protection of the rights of inventors, authors, etc. by statute.

Government Service Free of Charge - services where cost is paid entirely or almost entirely out of general tax revenues.

Government Quasi-Commercial Activity - services provided by a government department, agency or crown corporation where the prices charged to users are expected to cover a significant portion of the cost, or even to result in a profit. Also includes debt or equity financing by government where a cash return is expected.

Government Purchasing - contracting out or purchasing policies whose intent is at least partly to influence the development of the private sector.

Subsidies - cash payments by the government, whether one-time or recurring, intended to make an activity more attractive or viable for producers or consumers.

Tax Incentives/Disincentives - measures to reduce (increase) the income or other taxes otherwise payable by producers or consumers in order to encourage (discourage) them to undertake a particular activity.

Persuasion/Information - efforts by the government to encourage actions in the public interest but without the use of legal sanctions or monetary incentives.

International Agreement - agreements binding on Canada and other nations to facilitate or regulate trade and information exchange and to ensure co-ordination of activities.

Objective

Economic Development of Sector - programs one of whose principal stated objectives or intended effects is to foster commercial operations in the communications/information sector, generally under private ownership, which will ultimately be self-sustaining financially.

Other Objectives - programs related to the communications/information sector but one of whose principal stated objectives or intended effects falls outside the definition for economic development of the sector.

Technology - programs to assist the economic development of the sector through the development of new technology with respect to products, uses, components, inputs, production processes or distribution methods.

Marketing/Distribution - programs to assist the economic development of the sector through the implementation of improved marketing and distribution practices or facilities, including those for export purposes.

Production/Procurement - programs to assist the economic development of the sector through the implementation of improved production or procurement practices or facilities, including assistance to suppliers of components or raw materials.

Human Resources - programs to assist the economic development of the sector by increasing the supply of personnel with relevant qualifications or by assisting the sector in obtaining such personnel.

Capital - programs to assist the economic development of the sector by increasing the amount of equity or debt financing available. Programs which focus on increasing revenues would not be included, nor would financial assistance directed toward specific objectives such as technology development.

Stimulating Demand - programs to assist the economic development of the sector by encouraging the purchase of its output. Programs to encourage multinationals to locate a greater proportion of their production in Canada would also be included. When the stimulus is to demand for the products of another component, an abbreviation is used to indicate the sub-sector affected, for example, CO for content or EO for equipment.

Orderly Market - programs to maintain order in the marketplace, normally for the benefit of all participants rather than to favor some specifically.

Infrastructure at Reasonable Cost - programs to ensure that communications/information services needed by businesses and households generally are available to them and that the cost is reasonable. Such programs contribute to economic development generally, but the development of the communications/information sector is a means rather than an objective.

Economic Sovereignty - programs to ensure that Canada has some degree of self-sufficiency in aspects of the communications/information sector considered vital to the economy as a whole. Distinguished from programs directed to the economic development of the sector because support for the activities is not based on the expectation that they will become financially self-sustaining.

Social Equity - programs related to considerations such as individual privacy, accessibility of information about government, non-discrimination and assistance to the disadvantaged including people living in isolated areas.

Cultural - programs related to considerations such as development and protection of Canadian culture, the availability of cultural products with Canadian subject matter, and the enlightenment or cultural enrichment of the public generally.

Cost

When available, cost figures refer to estimated expenditures for the 1981-82 fiscal year, or for non-recurring programs to the latest total estimated cost.

APPENDIX E

SELECTED STATISTICS

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MESSAGE VOLUME
(millions)

	<u>Telephone Calls</u>		<u>Originating Mail</u>		<u>Telegrams</u>
	Local	Toll	First Class	Total	
1970	15,437	458	N/A	4,553	6.9
1971	16,439	495	2,936	4,713	5.9
1972	17,777	572	3,141	4,751	5.1
1973	18,397	658	3,347	5,074	3.5
1974	19,937	764	3,504	5,316	3.7
1975	20,341	854	3,244	4,941	4.1
1976	21,301	918	3,687	5,804	2.7
1977	22,249	991	3,610	5,965	2.3
1978	22,987	1,083	3,725	6,056	2.2
1979	23,886	1,211	3,906	6,409	2.0

Sources: Statistics Canada Catalogues 56-201, 56-203
Canada Post Annual Reports.

NUMBER OF TELEPHONES AND CABLE TV SUBSCRIBERS

(thousands)

	<u>Telephones</u>		<u>Cable TV</u> <u>Subscribers</u>	<u>Total</u> <u>Households</u>
	Residence	Business		
1970	6,896	2,854	1,164	5,894
1971	7,273	2,996	1,388	6,082
1972	7,804	3,183	1,689	6,277
1973	8,249	3,428	2,116	6,487
1974	8,763	3,691	2,561	6,686
1975	9,237	3,928	2,861	6,887
1976	9,758	4,127	3,143	7,093
1977	10,179	4,309	3,417	7,283
1978	10,644	4,528	3,776	7,491
1979	11,078	4,761	4,084	7,716

Sources: Statistics Canada Catalogues 56-203 and 56-205.

PENETRATION RATES*Percentage of households with specified communications/information equipment

Radios	98.7
TV (all types)	97.7
Telephones	97.6
Record players and tape recorders	83.0
TV (colour)	81.1
Cable television	54.8

Percentage of households with other major equipment

Electric refrigerators	99.6
Toilets	99.0
Installed bath facilities	98.7
Automobiles	79.8
Electric washers	77.3
Clothes dryers	63.1
Home freezers	51.0
Automatic dishwashers	28.5

* Statistics Canada Catalogue 64-202. Figures are for May 1980.

OPERATING REVENUES
CARRIAGE SUB-SECTOR

	<u>Post Office</u>	<u>Telephone Companies</u>	<u>Other Telecommunications</u>	<u>Cable TV</u>
1970	533.5	1,526.2	136.9	54.9
1971	581.2	1,676.3	146.4	66.6
1972	654.1	1,871.4	163.2	82.5
1973	768.3	2,127.1	190.7	107.0
1974	938.7	2,435.6	230.1	133.4
1975	1,114.4	2,861.2	259.1	162.3
1976	1,353.6	3,363.6	278.3	199.2
1977	1,505.0	3,853.9	302.1	233.0
1978	1,594.1	4,472.3	348.3	273.2
1979	1,762.7	5,151.4	411.8	313.7

Sources: Statistics Canada Catalogues 56-201, 56-203 and 56-205
Canada Post Annual Reports.

OPERATING REVENUES
EQUIPMENT AND COMPUTER SERVICES SUB-SECTORS

	<u>Household*</u> <u>Radio & TV</u> <u>Equipment</u>	<u>Communications*</u> <u>Equipment</u>	<u>Office &*</u> <u>Store</u> <u>Machinery</u>	<u>Computer</u> <u>Services</u>	<u>Sales &</u> <u>rental</u> <u>of EDP</u> <u>Hardware</u>
1970	213.0	712.0	190.0		
1971	256.0	660.0	203.0		
1972	310.0	756.0	262.0		
1973	352.0	889.0	287.0		
1974	315.0	1,225.0	346.0	211.0	612.0
1975	274.0	1,368.0	373.0	285.7	648.8
1976	254.0	1,383.0	412.0	327.5	720.7
1977	166.0	1,441.0	417.0	416.0	797.1
1978	176.0	1,648.0	547.0	531.8	879.8
1979	238.0	1,925.2	702.0	638.0	929.9
1980	250.0	2,319.0	795.0		

* Value of shipment of goods of own manufacture

Sources: Statistics Canada Catalogues 43-205, 43-206, 42-216 and 63-222.

OPERATING REVENUES
CONTENT SUB-SECTOR

	<u>Broadcasters</u>	<u>Printing &* Publishing</u>	<u>Publishing Only</u>	<u>Film & Videotape Production</u>	<u>Cinemas</u>	<u>Film Distributors</u>
1970	429.3	588.8	150.8			
1971	452.7	614.9	177.2			
1972	514.2	680.2	204.3			
1973	622.7	766.8	287.8			
1974	684.5	878.8	332.5			
1975	851.8	1,002.1	392.0	89.8	211.4	114.9
1976	1,001.5	1,147.9	462.9	106.0	224.0	127.1
1977	1,130.2	1,213.5	520.4	113.9	229.7	145.2
1978	1,270.6	1,315.7	662.9	113.3	251.9	180.2
1979	1,458.4	1,496.0	730.9	139.6	277.5	212.4

* Value of shipments of goods of own manufacture

Sources: Statistics Canada Catalogues 56-204, 36-203, 63-206 and 63-207.

EMPLOYMENT
CARRIAGE SUB-SECTOR

	<u>Post Office</u>	<u>Telephone Companies</u>	<u>Other Telecommunications</u>	<u>Cable TV</u>
1970	37,051	68,334	7,678	1,992
1971	38,974	69,995	7,553	2,180
1972	41,267	72,671	7,323	2,598
1973	43,817	75,407	7,047	3,098
1974	47,442	81,225	7,163	3,691
1975	50,779	82,866	7,162	4,084
1976	52,538	83,864	6,973	4,640
1977	53,243	87,546	6,863	4,838
1978	53,053	92,873	7,150	5,293
1979	52,819	96,539	7,247	5,569

Sources: Statistics Canada Catalogues 56-201, 56-203 and 56-205.

EMPLOYMENT
EQUIPMENT AND COMPUTER SERVICES SUB-SECTORS

	<u>Household Radio & TV Equipment</u>	<u>Communications Equipment</u>	<u>Office & Store Machinery</u>	<u>Computer Services</u>	<u>Sales & rental of EDP Hardware</u>
1970	7,922	45,213	15,769		
1971	7,737	44,582	8,696		
1972	8,163	40,148	10,134		
1973	8,748	43,719	10,866		
1974	8,259	44,281	11,397	8,956	9,462
1975	7,036	42,041	9,613	9,693	9,501
1976	6,347	38,467	9,758	10,245	8,927
1977	3,382	36,676	8,635	11,831	8,341
1978	2,332	37,895	9,629	13,148	8,855
1979	2,946		11,791	14,370	9,468

Sources: Statistics Canada Catalogues 43-205, 43-206, 42-216 and 63-222.

EMPLOYMENT
CONTENT SUB-SECTOR

	<u>Broadcasting</u>	<u>Printing & Publishing</u>	<u>Publishing Only</u>	<u>Film & Videotape Production</u>
1970	19,576	32,828	5,628	
1971	19,789	31,732	6,155	
1972	20,124	31,594	6,767	
1973	21,172	32,707	8,471	
1974	22,261	32,786	8,791	
1975	23,497	33,562	9,182	1,737
1976	24,680	34,275	9,371	1,793
1977	25,651	33,026	9,515	2,185
1978	26,851	34,334	11,001	1,822
1979	27,675	36,350	10,128	2,165

Sources: Statistics Canada Catalogues 56-204, 36-203, 63-206 and 63-207.

TRADE BALANCE AND DOMESTIC MARKETCOMMUNICATIONS EQUIPMENT
(incl. components)

	<u>Apparent Domestic Market</u>	<u>Shipments</u>	<u>Imports (Less Re-exports)</u>	<u>Exports</u>	<u>Trade Balance</u>	<u>% Shipments/A.D.M.</u>
1970	729.1	712.0	258.1	241.0	(17.1)	97.7
1971	745.2	660.0	297.2	212.0	(85.2)	88.6
1972	927.6	756.0	391.6	220.0	(171.6)	81.5
1973	1,085.3	889.0	520.3	324.0	(196.3)	81.9
1974	1,455.9	1,225.0	605.9	375.0	(230.9)	84.1
1975	1,532.9	1,368.0	553.9	389.0	(164.9)	89.2
1976	1,637.1	1,383.0	674.1	420.0	(254.1)	84.5
1977	1,831.0	1,441.0	787.0	397.0	(390.0)	78.7
1978	2,084.4	1,648.0	964.4	528.0	(436.4)	79.1
1979	2,518.6	1,925.2	1,343.1	749.7	(593.4)	76.4
1980	2,871.6	2,319.0	1,593.6	1,041.0	(552.6)	80.8

Source: Electrical and Electronic Industries Statistical Summary 1980,
Department of Industry, Trade and Commerce.

TRADE BALANCE
COMMUNICATIONS EQUIPMENT AND COMPONENTS SEPARATELY*

	<u>Communications</u>			<u>Components</u>		
	<u>Imports</u>	<u>Exports</u>	<u>Balance</u>	<u>Imports</u>	<u>Exports</u>	<u>Balance</u>
1970	114.1	183.0	68.9	159.6	58.3	(101.3)
1971	132.0	144.4	12.4	181.0	67.9	(113.1)
1972	140.1	133.9	(6.2)	266.9	86.5	(180.4)
1973	174.3	186.7	12.4	369.6	137.1	(232.5)
1974	206.9	221.9	15.0	428.9	152.8	(276.1)
1975	248.3	261.9	13.6	346.1	127.0	(219.1)
1976	293.6	289.5	(4.1)	419.7	131.1	(288.6)
1977	355.1	258.3	(96.8)	469.1	138.8	(330.3)
1978	387.8	327.1	(60.7)	618.9	200.4	(418.5)
1979	413.4	532.2	118.8	997.2	217.4	(779.8)
1980	454.0	730.0	276.0	1,237.0	311.0	(926.0)

* Imports exceed those shown elsewhere for communications equipment and components combined because re-exports not deducted. This also affects the figures for the trade balance.

Source: Electrical and Electronic Industries Statistical Summary 1980,
 Department of Industry, Trade and Commerce.

TRADE BALANCE AND DOMESTIC MARKET
OFFICE AND STORE MACHINERY

	<u>Apparent Domestic Market</u>	<u>Shipments</u>	<u>Imports (Less Re-exports)</u>	<u>Exports</u>	<u>Trade Balance</u>	<u>% Shipments/A.D.M.</u>
1970	372.3	190.0	287.3	105.0	(182.3)	51.0
1971	401.4	203.0	345.4	147.0	(198.4)	50.6
1972	493.0	262.0	415.0	184.0	(231.0)	53.1
1973	539.9	287.0	457.9	205.0	(252.9)	53.2
1974	673.8	346.0	544.8	217.0	(327.8)	51.4
1975	714.9	373.0	613.9	272.0	(341.9)	52.2
1976	768.8	412.0	687.8	331.0	(356.8)	53.6
1977	806.8	417.0	736.8	347.0	(389.8)	51.7
1978	1,046.5	547.0	974.5	475.0	(499.5)	52.3
1979	1,234.6	702.0	1,174.6	642.0	(532.6)	56.9
1980	1,765.0	795.0	1,709.0	739.0	(970.0)	45.0

Source: Electrical and Electronic Industries Statistical Summary 1980,
 Department of Industry, Trade and Commerce.

TRADE BALANCE AND DOMESTIC MARKET
HOUSEHOLD RADIO AND TV EQUIPMENT

	<u>Apparent Domestic Market</u>	<u>Shipments</u>	<u>Imports (Less Re-exports)</u>	<u>Exports</u>	<u>Trade Balance</u>	<u>% Shipments/A.D.M.</u>
1970	298.8	213.0	114.8	29.0	(85.8)	71.3
1971	372.0	256.0	145.0	29.0	(116.0)	68.8
1972	514.3	310.0	231.3	27.0	(204.3)	60.3
1973	583.5	352.0	263.5	32.0	(231.5)	60.3
1974	588.1	315.0	306.1	33.0	(273.1)	53.6
1975	493.8	274.0	246.8	27.0	(219.8)	55.5
1976	605.7	254.0	382.7	31.0	(351.7)	41.9
1977	529.9	166.0	418.9	55.0	(363.9)	31.3
1978	591.5	176.0	510.5	95.0	(415.5)	29.8
1979	674.6	238.0	541.0	104.4	(436.6)	35.3
1980	712.6	250.0	530.6	68.0	(462.6)	35.1

Source: Electrical and Electronic Industries Statistical Summary 1980,
Department of Industry, Trade and Commerce.

CONTRIBUTION OF THE COMMUNICATIONS SECTOR TO GROSS DOMESTIC
PRODUCT, AND WAGES, SALARIES AND SUPPLEMENTARY LABOUR INCOME

Year	GDP at Factor Cost (millions of current \$)			Wages, Salaries and Supplementary Labour Income (millions of current \$)		
	Total	Comm. Sector	% of Total	Total	Comm. Sector	% of Total
1952	22,125	396	1.79	12,073	271	2.24
1953	23,060	428	1.86	13,062	299	2.29
1954	23,267	475	2.04	13,451	327	2.43
1955	25,630	533	2.08	14,369	357	2.48
1956	28,658	599	2.09	16,171	402	2.49
1957	30,078	656	2.18	17,519	454	2.59
1958	31,096	706	2.27	17,982	484	2.69
1959	32,827	773	2.35	19,149	504	2.63
1960	34,192	841	2.46	20,141	533	2.65
1961	35,388	899	2.54	21,009	561	2.67
1962	38,377	977	2.55	22,468	589	2.62
1963	41,150	1,042	2.53	23,932	633	2.64
1964	44,696	1,154	2.58	26,034	664	2.55
1965	48,894	1,265	2.59	28,878	738	2.56
1966	54,764	1,384	2.53	32,629	825	2.53
1967	58,793	1,552	2.64	36,160	931	2.57
1968	64,165	1,670	2.60	39,318	1,012	2.57
1969	70,778	1,929	2.73	43,949	1,128	2.57
1970	75,427	2,105	2.79	47,620	1,242	2.61
1971	82,867	2,285	2.76	52,436	1,356	2.59
1972	92,719	2,689	2.90	58,549	1,536	2.62
1973	109,830	2,938	2.68	67,849	1,738	2.56
1974	132,255	3,339	2.52	81,289	2,165	2.66
1975	150,726	3,738	2.48	94,625	2,503	2.65
1976	172,584	4,230	2.45	109,375	2,904	2.66
1977	189,550	5,008	2.64	120,491	3,213	2.67
1978	210,880	6,537	3.10	131,308	3,538	2.69
1979	239,656	6,537	2.73	145,896	3,968	2.72

TELECOMMUNICATIONS PLANT, AT COST

(millions of dollars)

Year	Telephone Companies				Telegraph/Cable Companies			
	Plant at cost (\$ m)	Accum. Depreciation	Net Plant (\$ m)	Net Plant/ Emp. (\$)	Plant at cost (\$ m)	Accum. Depreciation	Net Plant (\$ m)	Net Plant/ Emp. (\$)
1970	6,571	1,656	4,915	71,930	571	184	387	50,341
1971	7,225	1,882	5,343	76,333	607	199	408	53,995
1972	7,960	2,091	5,869	80,763	644	218	426	58,175
1973	8,791	2,335	6,456	85,625	789	250	539	76,494
1974	10,040	2,633	7,407	91,183	856	292	564	78,700
1975	11,426	2,958	8,468	102,190	940	337	603	84,100
1976	12,936	3,366	9,570	114,118	978	385	593	84,100
1977	14,532	3,854	10,678	121,964	1,030	402	628	91,400
1978	16,030	4,343	11,687	125,839	1,161	444	717	100,200
1979	17,755	4,984	12,771	132,286	1,299	500	799	110,206

Source: Statistics Canada Catalogues 56-201, 56,203.

TOWARD A POLICY FRAMEWORK FOR THE
ECONOMIC DEVELOPMENT OF THE
COMMUNICATIONS/INFORMATION SECTOR.

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