RECONCILING INCREASED COMPETITION TO INDUSTRIAL POLICY IN THE CANADIAN TELECOMMUNICATIONS SECTOR

PHASE I: Policy-Making at the National Level

Department of Political Studies

University of Guelph
Guelph Ontario · Canada · N1G 2W1

University of Guelph

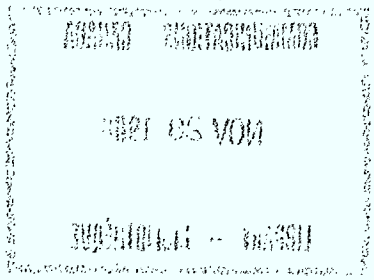
RECONCILING INCREASED COMPETITION TO INDUSTRIAL POLICY IN THE CANADIAN TELECOMMUNICATIONS SECTOR

PHASE I: Policy-Making at the National Level

R. Brian Woodrow and Kenneth B. Woodside,
Principal Investigators

Allan Kennedy, Research Associate

Submitted: March, 1986



ACKNOWLEDGEMENT

This project has been undertaken through the federal Department of Communications' University Research Grants Program. We would like to thank Mr. Terry Rochefort, the scientific authority for the project, and, in particular, Mr. Peter Smith, whose cheerful and helpful counsel guided us throughout the project.

In addition, we would also like to acknowledge and extend our appreciation to the fifty or so people we interviewed - in various government departments and the private sector - who gave generously of their time and expertise.

Finally, the views and opinions expressed in the report are our own and should not necessarily be attributed to the Department of Communications or any of its officials.

TABLE OF CONTENTS

CHAPTER ONE: INCREASED COMPETITION AND ITS IMPACT ON INDUSTRIAL POLICY IN THE CANADIAN TELECOMMUNICATIONS SECTOR

1.1 Introduction to the Increased Competition/Industrial Policy Problem

Telecommunications policy and practice in Canada has recently been evolving along two quite different tracks. On the one hand, through a series of regulatory decisions over the past six years, the CRTC has provided for the slow but steady introduction of competition into several areas of the telecommunications sector which previously had been treated as essentially monopolistic and subject to regulatory control. As well, continued technological advance resulting in new products and services as well as growing competitiveness among firms on the international scene has served to reinforce domestic regulatory relaxation. This impetus towards competition on the part of the regulatory authority at the federal level and increasingly in some provinces is widely expected to continue and the federal Department of Communications - through its telecommunications policy review - is moving to confirm and expand this orientation. At the same time, however, governments in Canada at both the federal and provincial levels as well as many of the major private- and public-sector companies in the communications field find themselves rooted in an implicit industrial policy - or really a set of industrial policies - which has evolved over the years largely out of the logic of regulated monopoly conditions. That set of industrial policies, pursued within both the telecommunications sector specifically and elsewhere in government, was designed to sustain a world-scale telecommunications capability in Canada as a first priority as well as to encourage the establishment and growth of as many medium- and small- firms in the telecommunications and informatics area as possible. More and more, however, all the major actors are becoming aware of the important industrial policy implications of

operating, domestically as well as internationally, in an increasingly competitive environment.

As a matter of analysis and policy, one key problem which must be examined by the Department of Communications relates to how increased competition can be reconciled to concerns about industrial policy in the telecommunications field and, more specifically, what this implies about the future role of government and the use of appropriate policy instruments. To be sure, competition provides a most appealing and potent dynamic for industrial policy in the telecommunications sector but it also implies serious disruptions in the existing structure of the telecommunications sector as well as a concurrent loss of control on the part of government - or at least a change in the nature of the exercise of this control -in dealing with major telecommunications actors. The implicit industrial policy followed in the telecommunications sector has been based upon traditional notions of price, entry and rate of return regulation, acceptance of a considerable degree of vertical integration, a modest role for public enterprise and dependence on the telcos themselves for coordination of the system, support for public and private sector research and development, limitation on foreign access to the domestic telecommunications market, and encouragement for Canadian firms attempting to crack the world telecommunications market. As that implicit industrial policy comes increasingly under pressure with the introduction of greater domestic competition, governments and major telecommunications actors will have to reassess industrial policy, the role which government plays, and the mix of policy instruments used to put telecommunications policy into effect.

This project, funded under the DOC's university research program,

focuses specifically on the problem of reconciling increased competition to industrial policy in the Canadian telecommunications sector, i.e. what we will refer to as the IC/IP problem. It grows directly out of previous research which the authors conducted for the Institute for Research on Public Policy and which sought to identify the major issues likely to confront telecommunication policy and regulation in Canada during the late 1980's. In that study, we identified five major issues:

1) the role of the telecommunications sector in the emerging "information business" and particularly the threat of "bypass" and the erosion of industry "boundaries";

2) the eventual balance to be struck among monopoly, competition and regulation and specifically the separation of competitive from monopoly markets;

3) problems associated with telecommunications costing and pricing and particularly the "cross-subsidization" issue;

4) the continuing need for jurisdictional and regulatory reform in the telecommunications field; and

5) the reconciliation of increased competition to traditional and current industrial policy concerns.*

Because of its size and scope and its more tangential relationship to the others identified above, this final issue was not treated in detail in the previous study but has now become the subject of the present report.

The crux of the IC/IP problem is that increased competition - whether the result of technological advance, change in domestic regulatory practice, or international market conditions - poses an important challenge to the implicit industrial strategy and range of policies which governments in Canada have pursued over the years in the telecommunications sector.

---

* R. Brian Woodrow and Kennth B. Woodside, "Players, Stakes and Politics in the Future of Canadian Telecommunications Policy and Regulation" (mimeo., 1984); subsequently published in S. Globerman, et. al., Competition and Technological Change: The Impact on Telecommunications Policy and Regulation (Montreal: IRPP, 1986).

This project examines how recent and prospective movement towards even greater competition might be reconciled to Canada's continuing and legitimate concerns about industrial policy and, more specifically, what this implies about the future role of government and the use of appropriate policy instruments. The telecommunications sector will be specified broadly to include not only the major telecommunications carriers and equipment manufacturers but also related elements in the "information business" such as the cable, satellite, computer and informatics industries. Owing to the fact that policy and practice relating to the telecommunications sector in Canada has national, federal-provincial, and international dimensions, it was decided that this project should be separated into three phases. This report relates to Phase I and deals with the IC/IP problem and policy-making at the national level.

The methods used in preparing this report fall into three basic categories. First of all, there has been a substantial gathering of documentary materials from books, periodicals and available research studies. Much of this work has been done by Mr. Allan Kennedy - our research associate on this project - and we would like to thank him for his efforts. A second dimension of our research has focused on identifying and developing the ten situations outlined in Chapter II and examined in more analytical terms in Chapters IV and V. We felt that this type of situational analysis has been most helpful in enhancing our own understanding the the IC/IP problem and making it more concrete and useful for the sponsor. Finally, we have conducted more than 50 interviews with government, industry and special interest groups involved with this problem. As academics, we have benefited greatly from the opportunity to discuss this problem with such a wide range of people knowledgable about

this subject. We have not referred to any individuals interviewed by name but the views which they expressed are suffused throughout the analyses contained in the final three chapters.

As outlined in the terms of reference for the project, this report on the IC/IP problem and policy-making at the national level seeks to accomplish four tasks:

1) to explicate in some detail the crux of the problem involved in reconciling increased competition to industrial policy in the telecommunications sector in Canada, not only at a theoretical level but also in terms of specific manifestations of the problem;

2) to develop and utilize a suitable framework for analysing the telecommunications sector in Canada in terms of industry structure and government policies as well as a more precise specification of possible policy instruments which government might use in dealing with the problem;

3) to describe and assess the views, interests and perceptions of the major actors concerned with the problem - within government, in industry, and among special interest groups; and

4) to evaluate the need for change in the mix of government policies presently being pursued in dealing with the IC/IP problem as well as how specific policy instruments might better be used to reconcile increased competition to industrial policy at the national level.

It is to the first two tasks that we now turn in the remainder of Chapter One.

Our report on the reconciliation of increased competition to industrial policy in the telecommunications sector is divided into five chapters. The present Chapter I has introduced the IC/IP problem, developed the basic premise upon which the study is based, set out a basic model for examining the telecommunications sector as part of the broader "information business" and the impact of telecommunications policy and other related government policies upon it, and dealt with the various levels upon which a reconciliation of increased competition to industrial policy might take place. Chapter II will elaborate upon the IC/IP problem

in greater detail by describing ten different situations where the problem manifests itself in different forms, setting out the main features of each case and how increased competition affects industrial policy and indentifying the main policy instrument which is challenged. Chapter III then proceeds to detail the results of our interviews by providing a profile of the major players on ths issue - government, industry and special interest groups - and their particular views, interests and perceptions of increased competition and its impact on industrial policy considerations in the telecommunications sector. Chapter IV and V conclude the study be dealing with the reconciliation of increased competition to industrial policy, initially on the macropolitical level in terms of federal telecommunications policy and its interaction with other government policies and subsequently in terms of the changing applicability of specific policy instruments.

1.2 Sources and Evidence of Increased Competition in the Canadian Context

As of the mid-1980's, Canada sustains only a modest degree of competition among firms within the telecommunications sector even though more extensive and purer forms of competition are evident within the broader "information business" and the prospects are good for increased competition in the years to come. Local and long distance telephone service continues to be provided on a "regulated monopoly" basis across the country and competition in the provision of common carrier telecommunications facilities is strictly limited. [English, 1973; McPhail and McPhail, 1985] The advent of cellular mobile radio, the possibilities of cable as an alternative distribution system, local area networks, "smart buildings" and other developments are just beginning to nibble away at the edges of the local service monopoly. [Kelley, 1985] With regard to long-haul

transmission, pressures for increased competition are stronger and more immediate but still under strict control. For thirty years now, CNCP Telecommunications (whose predecessor organization had operated telegraph and other facilities dating back to the last century) has been allowed to operate a nation-wide microwave network in addition to the long-haul facilities available to Telecom Canada through the major telcos, although direct competition has been limited to private line and data communications and, as the 1985 CRTC decision demonstrates, has not been allowed to extend to interexchange competition serving the whole long distance market. [CRTC Telecom Decision 85-19] As well, Telesat Canada and Teleglobe continue to provide domestic satellite services and overseas telecommunications on a monopoly basis.

With regard to services as distinct from facilities, competition among a variety of service providers is becoming increasingly possible as a result of recent CRTC decisions on enhanced services and resale and sharing, both of which open up these markets to competitive behavior subject to some degree of continuing regulatory control. [CRTC Telecom Decision 83-72; CRTC Telecom Decision 85-19] In the area of equipment manufacturing and supply, the status of competition is more mixed but, in any case, not subject to the kind of regulatory control evident elsewhere in the telecommunications sector. Northern Telecom, as the vertically-integrated arm of Bell Canada Enterprises and a Canadian multinational in its own right, dominates most areas of telecommunications manufacturing domestically in Canada and has become a major player in North American and world telecommunications markets while medium- and small-sized firms like Microtel, Mitel and others also compete on a more limited basis in Canadian and foreign markets. As well, a vigorous interconnect equipment market has

emerged in Canada since 1980 both with regard to the supply of such equipment domestically and its manufacture worldwide. [DOC, 1984; DRIE, 1984] And finally, with regard to the related area of computer equipment and services, the Canadian market is unregulated and thoroughly competitive with hardware supplied overwhelmingly by foreign multinationals, and particularly IBM, while Canadian firms have established themselves in "niche" manufacturing or in the services area. [DRIE, 1984; DEA, 1984] Thus, over the past twenty years or so and especially during the last five, competition has become an increasingly prominent feature of the telecommunications sector and is well established within other areas of the "information business".

The case for promoting as much competition as possible in the provision of telecommunications goods and services can be made both on theoretical and on practical grounds. The central rationale for competition is that it normally results in a more efficient marketplace, allows for greater consumer choice at lowest possible prices and, especially in periods of rapid change, provides for a better allocation of investment capital and other scarce resources. [Armstrong, 1982; NTIA, 1983; Ergas and Okayama, 1984] Traditional justifications for "natural monopoly" were framed in terms of economies of scale, economies of scope, and economies of technological change but recent studies in Canada and elsewhere make it unclear that such conditions continue to exist with regard to the provision of certain telecommunications goods and services. [Fuss and Waverman, 1982; Economic Council of Canada, 1982] In these circumstances, many proponents of competition presume that competition is natural and desirable and, even where perceivable "market failure" might justify regulated monopoly, would argue that imperfect competition may well be preferable to that condition. On a more practical level, Canada may

have a national tradition where the play of competitive market has been more limited than in the United States but that may be changing. Competition is clearly in tune with the ideological climate of the times, in Canada as elsewhere in the Western world while monopoly and the "dead hand" of regulation is just as clearly out of tune. [Zysman, 1984; Fedorowicz, 1985; Pryde, 1985] Moreover, given developments in telecommunications technology and the convergence of telecommunications and computer technology and services, the maintenance of effective regulated monopoly conditions is increasingly difficult and would require an extension of government into areas of the "information business" such as computer services which have traditionally gone unregulated. [Brock, 1981; Irwin, 1981] The case for increased competition, then, is strong and, both on a theoretical and practical level, has created a state of disequilibrium where an ongoing reassessment of monopoly, competition and the role of regulation is taking place.

Recent pressures for increased competition coming from actual and prospective entrants, the demands of the user communities and especially big business, the "demonstration effect" of the U.S. experience and, not least important of all, the changing attitudes of many Canadian policy-makers and regulators, have already swung the balance in favour of increased competition. At the same time, however, there are distinctive features to the Canadian situation which will shape and influence continued movement towards increased competition in this country. Among these are a very distinctive jurisdictional and regulatory situation where the scope of federal jurisdiction and the role of regulatory authorities are much less clear, no telecommunications company that is equivalent in size or function to A T & T in the United States or to the European PTT's, no effective

antitrust tradition which might be used as an alternative to regulation, as well as Canada's historic disposition to accept greater government intervention in an area like telecommunications. [Janisch, 1983] Thus, present-day pressures for increased competition in telecommunications are insistent and powerful but their precise impact in the Canadian context is far from clear.

What then are the major sources of increased competition in Canadian telecommunications? How powerful are they and what implications do they have for industrial policy in the telecommunications sector? Technological change, changes in domestic regulatory practice, and international market conditions are the three major sources of increased competition in the telecommunications sector in Canada. In the view of many observers, recent and ongoing advances in telecommunications and computer technology are the key factors promoting increased competition, what one author refers to as the "big wheel" which drives all the "little wheels" in the communications area. [Porat, 1978] Technological change in telecommunications has arisen in two ways - from within the telecommunications sector itself and as a result of the convergence of telecommunications technology with computer technology. Changes from within the telecommunications industry itself have been largely, although not entirely, concerned with improved transmission and switching capability. The overriding significance of these developments has been the extent to which they have made it possible for competitors to the telephone companies to appear and provide services using these new technologies. The spread in usage and availability of communications satellites with greater communications capacity and higher radiated power, transmitting increasingly on the 12 to 14 GHz bandwidth range, and concomitant advances in satellite receiver technology have produced a significant alternative to microwave transmission. As well, the

spread and high penetration of under-utilized coaxial cable transmission systems has provided a potential alternative communications system with the capacity to compete with the local switched telephone network. Another development, that of fibre optical transmission technology - with its enormously increased bandwidth capacity - seems likely to eventually replace coaxial cable and the paired copper wire and offers great potential for use in local and longer distance transmission as well as for high speed computer-to-computer linkages. Most of the new transmission systems - whether satellite transponders, coaxial cable or optical fibre - are also likely to use the digital rather than the analog format. Digital transmission is more appropriate to the efficient integration of data, voice, and video services, allows for improved signal quality and better error control, and is also more compatible with the needs of a modern information society. Finally, although in no way exhausting the list of new developments, there has been the development of electronic or computer-controlled switching with its faster call connections that is allowing the introduction of many new telephone services such as call-forwarding and automatic callback. The large switches of today are now essentially special-purpose computers and this has fundamentally changed the nature of the telecommunications sector. [Baer, 1978; Nordicity, 1983; Province of Ontario, 1984]

Equally if not even more significant as a source of technological change has been the convergence of telecommunications and computer technologies. Telecommunications systems are becoming increasingly integrated with computer systems to take advantage of their capacity for information storage, switching and general network control. At the same time, computers can be interconnected by means of communications networks

to form local area networks (LANs) in order to provide users with access to more sources of information and computing capacity and these LANs then have the capacity to stand alone as communications networks for large institutional users. The increased use of information processing within telecommunications systems results from the dramatic reductions in cost, size and capability of computer equipment. These reductions have flowed from major advances in chip technology and highly significant reductions in the costs and size of processing units and memory systems. As well, there have been important improvements in the cost and capabilities of modems which move the information in and out of computer systems and in the terminal equipment area. The humble telephone has become an increasingly sophisticated device integrating voice, data and even video capabilities and offering a variety of special features. [Baer, 1978; Nordicity, 1983; Province of Ontario, 1984] The importance of these developments is considerable because they encourage the expanded use of existing telecommunications networks as well as the emergence of new distribution systems and communications and information services.

The net result of these developments - both within telecommunications itself and in terms of the convergence of telecommunications and computer technologies - has been to provide a massive impetus towards change, not only technically but in a public policy context. The buzzword in the telecommunications field since the early 1980's has been "bypass" which relates to the various ways in which recent technological developments can be utilized in new or better ways to get around established telecommunications networks and both the threat as well as the reality of "bypass" is now substantial. [Business Week, 1984; Fortune, 1984; The Economist, 1985; Bolter, 1985] As well, these technological advances have also lead to the progressive erosion of boundaries between traditional

industry sectors such as telecommunications and computers. While there is some question as to whether there is likely to be additional major technological developments in the telecommunications field over the next decade or so, the continued elaboration and diffusion of existing technologies promises to be more than enough to sustain the pace of change. Technological developments are having a couple of important consequences for industrial policy with regard to telecommunications. First of all, they make possible substantially increased competition in the provision of telecommunications goods and services, not only within the traditional telecommunications sector itself but also among a wide range of telecommunication and computer-based companies in related industries and markets. [Irwin, 1984; Baumol and Willig, 1985] Secondly, they also have the potential to serve as the great deregulating force, challenging traditional concepts of monopoly and regulation in the telecommunications field which are far too static, far too backward looking to cope with forward looking, dynamic technological issues. [Irwin, 1984; Schultz, 1983]

The impact of technological change on the telecommunications sector has been widely documented and one of the best descriptions is that provided by Janisch and Irwin:

> First, information technology is multidisciplinary, multi-industry, multi-governmental and multinational. Such technology blends a diversity of forces without precedent. There is no indication that this confluence of forces will diminish in the decade ahead.
>
> Second, information products are characterized by miniaturization, incredible speed and dramatic cost reductions. These, in turn, translate into lower priced products.
>
> Third, "smart" or "intelligent" products that store, process and transmit information now migrate to more and more users. The result is an added number and range of new information services available to the public. Today, we are experiencing a massive expansion in the

number and type of providers selling information services to untapped markets.

Fourth, sellers and products are generating an explosion of information distribution systems, a network of communications within buildings, between buildings, between corporate affiliates, nationally, locally and regionally and, in some cases, internationally. The pent-up pressures spawning such information networks appear irreversible in the decade ahead.

Fifth, market entry of firms into industries and industries into sectors marks a fundamental shift in the structure of an information oriented economy.

Sixth, boundaries separating diverse industries and corporations are softening and eroding. The conventional distinctions between products, services, hardware, industry and geographical locations are withering under technological assault. Indeed, the nomenclature of the past no longer suffices to describe the products, services and content of new offerings today and those in the future.

Seventh, the rate of change associated with technological innovation impacts industry boundaries, costing, pricing and product life. There is no sign of a diminution of this velocity even though rates of acceleration vary from year to year.

This characterization is now five years old but it continues to be accurate. [Janisch and Irwin, 1982]

Changes in domestic regulatory practice have also been a major source of increased competition both in the United States and Canada as well as elsewhere in the world. Whether called "deregulation" as in the United States, "liberalization" as in Britain or Japan, or the Canadian notion of "re-regulation", the essential meaning is much the same as policy-makers and regulators - as well as the courts in the United States - have moved on several fronts to relax or adjust barriers to entry and other regulatory restrictions and to create opportunities for the emergence of increased competition within particular industries or markets. [Economic Council of Canada, 1982] Pressures for changes in regulatory practice have typically come from prospective entrants seeking to offer particular services or

enter particular markets as well as from users of telecommunications goods and services, especially business users, who wish to reduce their costs or expand their range of choice. The U.S. experience provides the best example of a country which has moved deliberately and on several fronts towards dramatic change in their domestic regulatory practice, although not without considerable "pain" and "chaos". [Geller, 1983; Pierce, 1984] In Canada, changes in regulatory practice have come later, more slowly and with considerable unevenness across the country. As well, they have been most forthcoming and far-reaching in the area of services competition and less so with regard to facilities.

The trend towards increased competition has been greatest and most clean-cut in the United States where both the Federal Communications Commission (FCC) and the courts have been moving for more than two decades towards allowing greater competition in the telecommunications sector. This trend can be illustrated by brief reference to decisions with respect to terminal attachment, private lines, enhanced services, long distance competition, and industry structure. [Geller, 1983; Pierce, 1984] In the first place, interconnection of subscriber-owned equipment with the public-switched network was liberalized through a series of court decisions and FCC pronouncements culminating in the 1968 Carterfone decision which allowed virtually unrestricted terminal attachment. Second, the provision of private lines was opened up to competition commencing with the 1959 FCC Above 890 decision which made available a limited number of frequencies for privately-owned communications services and the subsequent 1969 FCC decision allowing MCI and other companies to compete actively against A T & T. Thirdly, in the Computer I and II decisions, the FCC established a working distinction between "basic" and "enhanced" services with the latter

to be deregulated and opened to competition although A T & T was permitted to offer enhanced services but only through a separate subsidiary. Fourthly, in 1980, following the important MCI v. FCC judgment three years earlier, the FCC moved directly to allow all interstate telecommunications services to be provided competitively. Finally, in 1984, there was Judge Greene's court-ordered divestiture of A T & T and the settlement of the Department of Justice's anti-trust action which resulted in the local operating companies being separated off and domiciled in the seven new Regional Holding Companies; A T & T retained the Longlines division and its equipment manufacturing and research and development functions so as to more readily permit effective competition in long distance and enhanced services as well as in equipment manufacturing. The overall impact of these regulatory and judicial decisions has been to move the United States away from what used to be stable "regulated monopoly" conditons and to push its telecommunications sector beyond "regulated competition" towards even purer forms of competition. [Millitzer and Wolf, 1985]

The "demonstration effect" of the U.S. experience on Canadian policy-makers and regulators, at least at the federal level, has already been considerable as they are being persuaded, in varying degrees, to respond rather similarly to pressures for increased competition. Over the past six years or so, the federal government and especially the CRTC, has led the way by allowing for increased competition - but by no means as extensive competition as in the U.S. - in many of the same areas as in the United States, even though provincial governments and regulators have not always followed that lead. [Stanbury and Thompson, 1982; Schultz, 1984] In the case of private lines and some data communications services, CNCP Telecommunications and its predecessor companies have since the 1950's operated their own microwave network to offer services in competition with

Telecom Canada and the major telephone companies across the country. A watershed decision by the CRTC in 1979 allowed CNCP to gain interconnection with the public switched network under federal jurisdiction, although provincial regulators have often been reluctant to extend this privilege to their own jurisdictions. As well, in 1980, the CRTC also permitted customer ownership of terminal attachment devices on an interim basis within federal jurisdiction and, in its final decision in 1982, this was extended to include the main set, but again the provincial regulatory framework for terminal attachment varies from province to province. With regard to enhanced services, the CRTC has followed the FCC in separating "basic" from "enhanced" services but has not yet prescribed any requirement for separate subsidiaries. Even the 1985 CRTC decision on long distance should be interpreted more as a delay rather than a denial of the movement towards increased competition. [CRTC Telecom Decision 85-19] Moreover, the federal Department of Communications has also recently taken a more favourable stance towards increased competition, allowing the Bell Canada reorganization to proceed, licensing competing companies to provide cellular radio service, and liberalizing satellite uplink ownership. While the CRTC has been the main protagonist in the introduction of increased competition, the federal government has also become more active and some provincial governments and regulators are also cautiously moving in that direction.

Thus, as of the mid-1980's, Canada sustains at least a modest degree of competition within the telecommunications sector - what is perhaps best described despite its seeming contradiction as a condition of "regulated competition" - in spite of jurisdictional and regulatory rigidities and considerable unevenness across the country. While "regulated monopoly" in

the terms which we have described it earlier in this section is declining in importance, it still applies to most of the Canadian telecommunications sector. As well, the prospect is definitely for greater competition in the years to come as the "demonstration effect" of the U.S. experience, for better or worse, comes to be understood more widely across the country and as further pressures for increased competition continue to mount as is now most immediately evident in the second CNCP application to provide competitive long distance service in Ontario, Quebec and British Columbia. Hudson Janisch [Janisch, 1983] has recently set out a number of reasons why he believes that increased competition - more or less following the same lines as has developed in the United States - is inevitable:

> My thesis is that we will be greatly influenced by these developments for six related reasons: first, because of the general similarity in the provision of telecommunications services in the two countries; second, because of the advent of competition in countries other than the United States; third, because competition has come about as a consequence of the adoption of common technology and not unique ideology; fourth, because of the irrelevance of national boundaries in an electronic age; fifth, because we have already crossed the divide with respect to competition in Canada, and sixth, because of a near total lack of institutional preparedness, the user demands of big business will prove to be irresistible.

There is considerably less agreement, however, on what form increased competition will take in the Canadian context and how it will affect the existing telecommunications sector and related industries and markets. [Woodrow and Woodside, 1984] While policy-makers and regulators - as well as the industry itself - may in certain cases attempt to limit or shape them to fit Canadian traditions and circumstances, the pressures for increased competition are building and, combined with the range of new technological possibilities available, are too strong to be easily dismissed or long delayed.

The third major source of increased competition within the Canadian telecommunications sector stems from international market conditions and the changing pattern of policy and regulation in other countries. In virtually every advanced industrial nation in the world, telecommunications is undergoing far-reaching structural and behavioral changes. [Ara, et. al., 1983; NTIA, 1983] In the United States, the creation of a slimmer, unencumbered A T & T as a result of the 1982 divestiture - and one free to pursue facilities, services and equipment competition more vigorously in foreign as well as domestic markets - is a major development but one which should not be allowed to detract from the even more important move by IBM through its recent takeover of Rolm and merger with MCI to position itself in domestic and foreign telecommunications markets. [MacAvoy and Robinson, 1983; Dracker, 1984; Barron's, 1985] In Great Britain, the privatization of British Telecom and liberalization of its regulatory regime promises to dramatically change that country's telecommunications system and open its domestic equipment market significantly to foreign suppliers. [Beesley, 1981; Williams, 1984] In Japan, a somewhat analogous process has been taking place with the privatization of Nippon Telephone and Telegraph and the emergence of a "Number 2" Telephone Company and, under pressure from the United States, actions are being taken haltingly to allow foreign companies into the Japanese telecommunications equipment market. [Japanese Research Institute of Telecommunications and Economics, 1983; Tomita, 1984; Vogel, 1984; Komiya, 1985] In Europe, the major PTT's in France, West Germany, Sweden etc. continue to follow protective policies vis-a-vis their domestic manufacturers but they are moving gradually to reduce monopoly practices in their telecommunications systems. [Bengendorff, 1983; Snow, 1983] And finally, among the Newly-Industrializing-Countries (NIC's) and the Less-Developed Countries (LDC's), the market for telecommunications

goods and services is there but the money to pay for building networks and replacing equipment often is not, unless government financial assistance can be arranged. [Hoffman, 1985] Throughout the world, then, national telecommunications policies and practices are in a state of flux as governments and companies respond to technological change and the pressures of increased competition.

Canada is by no means immune from the same kinds of trends and the various international factors which affect the telecommunications sector elsewhere in the world. One obvious factor is firm size and the balance of trade. This is dramatically evidenced by the fact that Northern Telecom - while the largest telecommunications equipment manufacturer in Canada and second-largest in North America - is only the eighth largest in size among companies involved in the world telecommunications market and a distant 46th largest among world information processing companies. Likewise, despite its apparent comparative advantage in telecommunications, Canada continues to run a substantial trade deficit in its overall balance of trade in the telecommunications and informatics area. [DOC, 1984] Another factor affecting the telecommunications sector are the tariff and non-tariff barriers erected by all countries to protect their telecommunications and related markets. The Japanese case is particularly notorious in that, until very recently, there was virtually no way that Canadian companies or those of any other nation seeking to export telecommunications equipment to Japan could crack the closed domestic market. [Surtees, 1984] Yet another factor relates to the pace and pattern whereby countries move to open their markets to increased competition and the way in which competition itself becomes internationalized. In the wake of deregulation and divestiture, the U.S. telecommunications market has

become probably the most open in the world and this has meant that Canada's Northern Telecom and Mitel, along with Britain's Plessey, West Germany's Siemens, Sweden's Ericcson, Japan's NEC have all moved to establish or expand their presence in the United States as a precondition for doing business in the American market. [Surtees, 1985] And finally, there are marked differences among countries in the way the telecommunications sector is organized and regulated. Canada is a bit of an anomoly in this regard with its mixed public/private, federal/provincial patchwork - quite different than the purely government-owned and controlled monopoly PTT's found in most Western European countries, Japan, or in many developing nations but also not the federally-supervised private sector pattern which is presently undergoing deregulation in the United States - and this raises its own problems in facilitating the expansion of trade and in international telecommunications regulation. [NTIA, 1983]

Telecommunications equipment manufacturing, including the interconnect market, is a multi-billion dollar business worldwide, with global sales totalling $40 billion in 1980, reaching over $60 billion in 1985, and estimated at $90 billion annually by 1990. [Little, 1982] International market conditions induce increased competition in virtually all countries for a number of reasons. First, a growing number of countries are moving to loosen their regulatory regimes and to permit greater foreign as well as domestic competition in the provision of telecommunications equipment though not so much in the facilities or services area. Secondly, because of the heavy R & D investment required for continuing innovation in the telecommunications sector, all the major manufacturing companies find it increasingly necessary to amortize their costs by moving beyond the domestic market to sell products in export markets. Third, because of continuing tariff and non-tariff barriers as well as an understandable

concern for domestic employment, the major telecommunications manufacturers operating as true multinationals find it expedient to locate plants and create jobs in those countries where their sales are made. Fourth, especially with regard to interconnect equipment, the market is becoming saturated, extremely price-sensitive and supplied largely from offshore because high labour costs make it prohibitively expensive to manufacture much of this equipment in the industrialized nations. Fifth and finally, as telecommunications costs become an increasingly significant expense for business users throughout the economy, those business users demand more powerful and cheaper telecommunications goods and services so as to remain internationally competitive within their spheres of activity. Thus, for all of these reasons and others, international market conditions are an increasingly important source of increased competition within the Canadian telecommunications sector.

Whether the result of technological advance, changes in domestic regulatory practice or international market conditions, increased competition in the telecommunications sector has become a fact of life in Canada as elsewhere. The evidence of increased competition is extensive and persuasive but it is its impact on and implications for telecommunications policy and the government's industrial policies that are more elusive. It has become the conventional wisdom that telecommunications costs are typically the third largest expense for most companies in terms of doing business. Several studies in Canada and the United States are available which demonstrate that increased competition in areas like long distance service would force rates to drop significantly and produce overall benefits for the economy as a whole. [Perl, 1983; Peat Marwick and Partners, 1984] Moreover, where increased competition has

been introduced in areas such as the interconnect market, the result has been the creation of vigorous demand and a new industry with jobs and income generated in sales if not always in manufacturing. [Northern Business Intelligence, 1983; ICA Telemanagement, 1983] And even in telecommunications equipment manufacturing, where increased competition would seem to threaten vertical integration and promote foreign access to the Canadian markets, this may ultimately be the price that must be paid to allow Canadian firms to export their products into foreign markets while perhaps also returning its own dividend by driving down prices in the domestic supply market. [Babe, 1981] These and several other arguments can be marshalled to demonstrate that increased competition can be beneficial in the telecommunications sector. Irrespective of whether it is beneficial or not, however, increased competition is also probably inevitable and the key question is what its impact and implications will be.

1.3 Its Impact and Implications for Industrial Policy

As the recent Royal Commission on the Economic Union and Development Prospects for Canada suggests, industrial policy means different things to different people. In its most general meaning, it can be used to refer to all government efforts to promote growth, productivity and the competitiveness of industry. The concept is also used in a more particular sense to refer to the secondary manufacturing as distinct from the primary or service sectors and implies some sort of blueprint for how industries within this sector should be organized and assisted by government to grow and develop. Some people use industrial policy in the singular as a kind of collective term to refer to a general course in which government policy is directed. Others use industrial policies in the plural to refer to a whole host of government policies and programs which bear upon industrial

development. And then there are the more value-laden uses of the term. On the one hand, there are those who argue that government should concentrate on creating a positive environment for private sector investment and growth and take a "hands off" approach to industrial policy. On the other hand, there is a quite different view that government's proper role in industrial policy is that of a "guiding hand" working with the private sector "to devise strategy and tactics that will reinforce the competitive position of domestic industry at home and abroad". And finally, there is another related term - industrial strategy - which has an even more specific meaning as a specific and clearly elaborated plan for the growth and development either of a particular industrial sector or the economy as a whole. [Royal Commission, 1985: Chapter 9; Jaffe, 1983; Kantrow, 1983]

Behind all this verbiage and qualification, however, lies a real and substantial issue which has been debated with increasing frequency and seriousness in Canada as elsewhere and which has particular significance for an industry such as the telecommunications sector in this country. Should a country follow a deliberate "industrial strategy" designed to exploit and promote particular sectors of their economy? Or should governments set out their policy objectives and instrumentalities for any particular sector and then attempt little more than to orchestrate and coordinate the various other government policies and programs which fit under the rubric of "industrial policies" and which would bear upon that sector? Or should government refuse to target any particular strategy and eschew any "industrial policy" - explicit or implicit - and concentrate instead only on the major levers of economic management? These are the three basic options available in the extensive literature on industrial policy and applicable to the telecommunications sector. The first option - a clear-cut "industrial strategy" - has been followed to a large extent in

Japan and in France with rather mixed results. [De Vos, 1983] It appears to have worked quite well in Japan where the high-profile Ministry of Industry and Trade (MITI) has been able to effectively organize and manage the planning process and even to provide much of the impetus for recent reforms in the direction of increased domestic competition while still maintaining Japan's focus on export markets. [Johnson, 1982; Tucker, 1985] The success or failure of France's efforts at an "industrial strategy" in the microelectronics area has been more debatable and hinges very much on whether or not the country can continue to insulate its market from foreign competition and control the activities of multinational corporations through licensing and joint-venture arrangements. [Zysman, 1977; Wright, 1984] In Canada, the "industrial strategy" approach has been favoured most explicitly by the Science Council of Canada which has, since 1971, advocated such a strategy and over the years has made numerous suggestions for specific initiatives in this direction. [Science Council, 1981; Science Council, 1984] Despite some half-hearted efforts in this direction by the Department of Industry Trade and Commerce during the 1970's and a major debate on the issue within Cabinet and at the top levels of government during the early 1980's, no "industrial strategy" for Canada's manufacturing industries, including telecommunications, ever came forward. Moreover, it would appear that the ideological and organizational momentum behind such an "industrial strategy" approach has now been spent and the issue is clearly a "non-starter" with the present government. [French, 1985; Rotstein, 1985]

The second option - one which focuses on the orchestration and coordination of "industrial policies" as they bear upon a particular industrial sector - has become the prime focus for discussion and debate in

recent years. Sectoral strategies have long been recognized in the literature on industrial policy and have been popular with governments in many countries who wish to target a particularly promising industry or rescue one that has fallen on hard times. The aerospace industry or textiles are two examples which come readily to mind and Great Britain, Sweden and even the United States - not to mention Canada - are countries which have adopted such strategies in the past. [De Vos, 1983; George, 1983] Sometimes those sectoral strategies have been explicit and stated while in other cases, as we will argue with regard to the telecommunications sector in Canada, they have been implicit but just as substantial. What is more controversial in the literature on industrial policy, however, is the feasibility of tying sectoral strategies such as might relate to the telecommunications sector to the broader range of "industrial policies" which a government follows. One can readily think of a wide range of "industrial policies" which bear directly or indirectly on a sector like telecommunications - R & D policy, trade policy, foreign investment policy, regional development policy, employment policy, immigration policy, etc. Many contemporary observers feel that the best that can be accomplished with regard to industrial policy is to synchronize these various policies to the government's basic goals for that sector. [Thurow, 1983; Beckman, 1983; Reich, 1983] This pragmatic approach to "industrial policies" is an increasingly popular and attractive one, combining as it does a recognition that industrial policy is important with a bias against overt government intervention.

The third option - one which denies the basic validity of "industrial policy" - is also influential in the debate on this subject but is not as prominent in Canada as it is in the United States. South of the border, there has been much greater hostility to the concept of industrial policy.

Most mainstream economists do not feel that any specific "industrial policy" is necessary and that appropriate macroeconomic policy combined with attempts at structural reforms such as "deregulation" or privatization where necessary will create the conditions within which all industries can prosper. [Schultze, 1983; Badarocco and Yoffie, 1983; Watson, 1983] Restatement of this mainstream view has been prompted by a smaller group of economists and management specialists who have argued that the United States should follow an "industrial policy" and follow through on it as a matter of national policy. [Reich, 1982; Bluestone, 1982] Attack and counterattack has been going on for the past few years but there appears to be little in the way of movement towards such an "industrial policy". Not only are mainstream economists against it but businessmen are likewise opposed to any additional government intervention in the economy. Similar sentiments come through loud and clear in Canada. [Wonnacott, 1975; Neufeld, 1982] At the same time, however, there is not a similar confidence in this country that broad-guaged macroeconomic policies can on their own do the trick and, consequently, more interest in "horizontal" or "framework" policies which would fill in the gap. This would seem to be very much the view of the present government in its words and actions over the past 18 months. [Watson, 1985; Rotstein, 1985]

Relating the ongoing debate on industrial policy specifically to the situation of the telecommunications sector in Canada, we will argue that the federal government has over the past twenty years or so followed an implicit sectoral strategy for Canadian telecommunications which has not been all that closely tied to related "industrial policies". However, increased competition within the telecommunications sector is forcing the federal government to question its commitment to such a sectoral strategy

and to look more towards the orchestration and coordination of related government policies and programs with a more explicitly-articulated telecommunications policy. [DOC, 1979] Such a telecommunications policy should espouse clear policy objectives, effective organizational infrastructure, and appropriate policy instruments to meet those objectives. In order to formulate such a telecommunications policy, it is necessary as a first step to clearly identify what that implicit industrial policy for Canadian telecommunications has been and how increased competition impacts upon it. The implicit sectoral strategy which Canada has followed in the telecommunications sector over the past twenty years or so has included the following features:

1) traditional notions of entry, price and rate of return regulation;
2) acceptance of a considerable degree of vertical integration;
3) a modest role for public enterprise;
4) support for public and private sector R & D;
5) limitations on foreign access to the domestic market;
6) encouragement for Canadian firms attempting to crack the world telecommunications market.

Each of these will now be briefly examined.

Traditional notions of entry, price and rate of return regulation have been central to Canada's implicit industrial policy for telecommunications. Local and long distance telephone service has been treated as a "natural monopoly" within any given territory as a result of the presumed presence of economies of scale, scope, technological innovations. It was felt that one firm could reasonably serve the entire market more efficiently than several competing firms, thereby avoiding unnecessary duplication of facilities and providing service at equivalent or lower costs. Because of the inherent tendency of all monopolies to overcharge and underserve, the telephone companies needed to be regulated by government with regard to prices charged and rates-of-return on capital. Regulation in the "public

interest" was designed both to prevent abuse of monopoly power and to achieve specific social or national objectives such as "universality" of access and a rough "equality" of service. To this latter end, telephone company pricing was designed on a "value of service" rather than a "cost of service" basis and a substantial element of "cross-subsidization" was built into the prices charged for long-distance as opposed to local service. And finally, the rate structure for all telecommunications goods and services provided was designed to meet an annual revenue requirement which would allow the telephone companies to meet its overall expenses as well as to realize a rate of return which allowed it to recover the cost of its investment and make a profit that would satisfy its owners, whether they be private shareholders or in some cases the government itself. Entry, price and rate of return regulation allowed telecommunications companies to steadily build up their network and to introduce new technology and services gradually while remaining largely sheltered from direct competition. [Woodrow and Woodside, 1984; Schultz and Alexandroff, 1986] However, competition has been nibbling away at "regulated monopoly" conditions in recent years as facilities competition has developed in selected areas, the specialized services and terminal equipment markets have become increasingly open, and the telcos begin to face increased competition in certain areas from the unregulated computer industry. In these circumstances, the contradictory character of "regulated competition" and its implications for the telecommunications sector and the economy as a whole is coming under scrutiny as is the appropriate role of regulation itself as an instrument of industrial policy. [Economic Council, 1982]

Acceptance of vertical integration between Bell Canada and B. C. Tel - the two largest telecommunications carriers - and their preferred suppliers

of network and terminal equipment became the backbone of this implicit industrial policy. It has been an essential ingredient in putting Northern Telecom in particular into the ranks of the world's largest telecommunications equipment suppliers allowing it to grow into the dynamic and innovative company that it has become at the same time that it has contributed significantly to the quality and integrity of the Canadian telecommunications network. From the point of view of the telecommunications carriers, the vertically-integrated telcos like the arrangement because it provides them with straightforward and secure sources of supply while allowing them to pass any excess costs for equipment on to the subscriber at the same time that they benefit from the overall business success of their preferred supplier; for their part, the non-vertically integrated telcos are able in principle to purchase equipment wherever they wish while knowing that high quality Canadian-made equipment is always available to them. From the point of view of the vertically-integrated telecommunications manufacturers, it provides them with a secure domestic market for their equipment, a unique opportunity to innovate and test the products, and a solid base from which to enter world markets. And from the point of view of government, vertical integration allows for the building up of at least one world-class Canadian company in the telecommunications sector - something which by comparison has been impossible in the computer industry - and to reap the benefits in terms of employment, R & D and tax revenues which might not be realized under other arrangements. Only the other domestic telecommunications manufacturers, potential foreign suppliers, and perhaps the telephone subscriber who may have to pay somewhat higher rates, would appear to be left out of the consensus. [Restrictive Trade Practices Commission, 1983; Babe, 1981] Vertical integration, however, also raises other questions about industrial

policy within the telecommunications sector. Vertical integration is a major deterrent to the emergence of new firms and increased competition in the domestic market at the same time that it keeps out foreign competitors. As well, it may impose largely unknown costs upon the overall economy as a result of the higher-than-competitive prices which might be passed on to the subscriber. And finally, as vertical integration allows a company like Northern Telecom to become larger and more dynamic in the domestic market, it creates a disposition for that company to go multinational and expand more and more into foreign markets and, concurrently a tendency for the government to progressively lose control over that company. Furthermore, as Canada and the United States have begun to negotiate some form of free trade agreement, vertical integration has emerged as an object of American discontent because it is viewed as an impediment to trade by U.S.-based suppliers. [Royal Commission, 1985] Thus, while vertical integration has in the past been central to Canada's industrial policy for the telecommunications sector, government's acceptance of its continued role is coming increasingly under attack.

The task of developing and operating Canada's telecommunications network has been handled primarily by the private sector. With the exception of the three prairie telcos and federal government involvement in Telesat Canada and Teleglobe Canada, government ownership is minimal and the bulk of the telecommunications sector rests in private hands. As well, given the patchwork jurisdictional and regulatory situation, the private sector telcos have evolved quite a unique form of "private sector cooperative federalism" whereby Telecom Canada is empowered to oversee and coordinate the operation of the national long-distance network. The role of government in Canada's telecommunications sector, however, has been

greater than any measure of ownership or direct responsibility for operations would imply. Partial government ownership of Telesat Canada and full ownership of Teleglobe Canada has been used strategically to guide the evolution of the telecommunications sector both in terms of substantive telecommunications policy and in terms of attendant industrial policy implications. Likewise, government ownership of the prairie telcos has brought a different perspective to bear on federal-provincial relations both of the public sector and private sector variety. Beyond matters of ownership, however, government involvement in planning activities through DOC, in the conduct of public sector R & D, in regulatory activities of a variety of types, and in attempting to establish telecommunications policy have all been critical to the evolution of the telecommunications sector and to the implicit industrial policy carried out by government. [Woodrow and Woodside, 1984] More and more, however, the need for continued governmental involvement is being challenged. Privatization of Teleglobe and perhaps later of Telesat is being actively promoted; government-directed innovation projects like Telidon or the office communications systems program are being questioned; the appropriate use of regulation is coming under attack; and the value of continued government support for vertical integration has been mooted. In short, the balance between public and private sector involvement in Canadian telecommunications is changing and the future of public ownership and control as a policy instrument for reconciling increased competiton to industrial policy is at stake.

For companies as well as for countries, market-oriented research and development has long been viewed as the key variable in explaining success or failure in the telecommunications sector and other areas of high technology. Since the 1960's, government has recognized this fact in its continuing attempts to formulate science policy and to link it effectively

to industrial policy. Canada was recognized as having an unusually low rate of investment in R & D among the industrialized nations of the world and this weakness seemed to be related as well to such factors as lower productivity, trade imbalances, and the declining competitiveness of Canadian firms. [MOSST, 1985] The telecommunications sector, however, was generally regarded as the exception rather than the rule and government came to direct its attention at expanding and strengthening R & D in this area. Public sector research on telecommunications was consolidated in the Communications Research Centre - and government-directed innovation projects were undertaken. Likewise, large private sector R & D operations like the Bell-Northern research partnership were encouraged and the need for a "critical mass" for R & D became a major justification for the continuation of vertical integration. With regard to the establishment of new firms, government began to mount a number of different industry support programs, sponsored by several different federal departments and agencies and carrying an "alphabet soup" of acronyms - which could and were used to support Canadian firms seeking to conduct research or develop new products. [MOSST, 1982] In the computer as opposed to the telecommunications area, there were fewer Canadian firms suitable for support and efforts came to be directed at encouraging multinational corporations like IBM, Burroughs, Control Data, among others to do more R & D in Canada and/or to enter into world product mandate agreements with their subsidiaries. And more recently, increasingly generous tax incentives as well as subsidy programs have been used to stimulate more Canadian R & D. [Minister of Finance, 1983] In spite of all of these efforts and with considerably less relevance to telecommunications, Canada's investment in R & D remains substantially below that of many other industrialized nations. Increased

competition in the telecommunications sector, however, would seem to complicate, if not exacerbate, this situation and questions need to be asked about the effectiveness of these various R & D initiatives and how well science policy has been linked to industrial policy in this area.

Although it may not always be admitted, industrial policy in the telecommunications sector has traditionally been premissed upon limitation of foreign access to the domestic market. All industrialized countries without exception follow this prescription to some extent at least. Canada has been neither the worst case nor the most exemplary one in this regard, being somewhere behind Japan and France in terms of limitations on access but also probably less receptive to foreign competition than the United States or more recently Great Britain. [NTIA, 1983] Access to the domestic Canadian market on the part of foreign competitors has tended to be limited by a number of practices. The procurement practices of the major telephone companies - principally those which are vertically-integrated but also the others - have traditionally been the major obstacle to foreign competitors and the federal government itself, in its own procurement practices, may also have favoured Canadian-sourced-or-manufactured products in some decisions. Tariff and non-tariff barriers are another limitation with Canada, for example, continuing to levy a 17.5% tariff on the import of telecommunications equipment from abroad while facing only a 4% tariff on its exports to the United States. Non-tariff barriers are also evident not only in procurement practices but what some would regard as unfair support programs for industrial development and regional development incentive grants. Foreign investment review practices are another form of limitation on access to the domestic market, although the telecommunications sector is not treated any differently than any other industrial sector in terms of takeover and new business assessment. And finally, government regulatory

controls especially in terms of use of the radio frequency spectrum and sourcing requirements such as exist in the Telesat Canada Act are typical of the limitations which foreign competition must face in this area. This litany of limitations may be extensive but it is not much different than that practiced by most other industrialized countries in the telecommunications field. [Lazar, 1982; Barton, 1984] Increased competition worldwide, however, poses a challenge to these limitations and a conundrum for industrial policy. Government must decide whether and how it can respond to the pressures of increased competition by relaxing limitations on foreign access while still finding acceptable ways of protecting and promoting domestic industry.

Finally, in what is really the other side of the coin from foreign access to domestic markets, there is the matter of encouraging Canadian firms attempting to crack the world telecommunications market. This facet of Canada's industrial policy for the telecommunications sector did not really become evident until the 1970's and represents its most recent addition. For many years, Canada's telecommunications manufacturers did not try to compete on the world market but concentrated primarily on supplying the domestic market. It has only been in the last ten years or so that Northern Telecom and later Mitel, Microtel and many of the Canadian-owned telecommunications and computer firms started to focus seriously on export markets, initially in the United States and increasingly in Europe, Japan and the Third World. [DOC, 1984] In recent years, government has also begun to place greater emphasis on export development and promotion and has taken a number of initiatives in this regard which can and have been beneficial to the Canadian telecommunications sector. However, the difficulties facing Canadian firms

attempting to crack world markets as well as the problems confronting government in supporting those firms are substantial. First of all, Canadian firms face most of the same limitations on their access to foreign markets as foreign firms face in our domestic market. As well, in the United States in particular, national security considerations are an added constraint on many medium-sized and smaller Canadian firms seeking contracts in this area. Secondly, many of the larger Canadian firms have found it necessary to transform themselves into multinational corporations in order to compete in foreign markets and consequently to set up manufacturing, distribution and sometimes R & D facilities in host countries. At times, this places government in the awkward position of developing markets and promoting products for Canadian companies who, if successful, will likely pursue those opportunities outside the country. Third, export financing, especially with regard to Third World telecommunications projects, has become a major problem. It is sometimes questionable whether the export financing arrangements which government must agree to in order to clinch a deal are so generous as to make that deal counterproductive either for government, the company, or both. And finally, government faces yet a different problem in an area like computers where foreign multinationals play such a major role in Canada and, in line with corporate policies, often show little interest in exploring export markets. In this case, industrial policy in Canada may be stymied by corporate policy set outside the country. Such are the difficulties of attempting to implement industrial policy in an increasingly competitive world telecommunications market. [Harris, 1985]

The six features which we have just identified and explored in brief detail should demonstrate that Canada has indeed pursued at least an implicit industrial policy in the telecommunications sector. It has not

been an overall "industrial strategy" in the sense of a clear plan for the development of that sector and how it fits with other industrial sectors. At the same time, government has not in the past followed a "hands off" approach either, content to concentrate only on macroeconomic and structural considerations. Rather, without making it explicit either in legislation or in other authoritative policy statements, government has followed quite consistently an "industrial policy" - really a set of "industrial policies" - in the Candian telecommunications sector. Increased competition - in whatever of the many forms it takes - jeopardizes many features of that industrial policy and makes the clarity, consistency and relevance of that industrial policy a matter for examination. In particular, one should look at how well telecommunications policy in Canada has made provision for increased competition and industrial policy considerations as well as how effectively that policy has been linked to other related government policies and programs. Moreover, one should also look at the changing role of government in the telecommunications sector and what this implies about the use of specific policy instruments to respond to those situations where increased competition and industrial policy considerations clash. At a general level, then, we would submit that we have now established the general nature of the IC/IP problem as it presents itself in the Candian telecommunications sector.

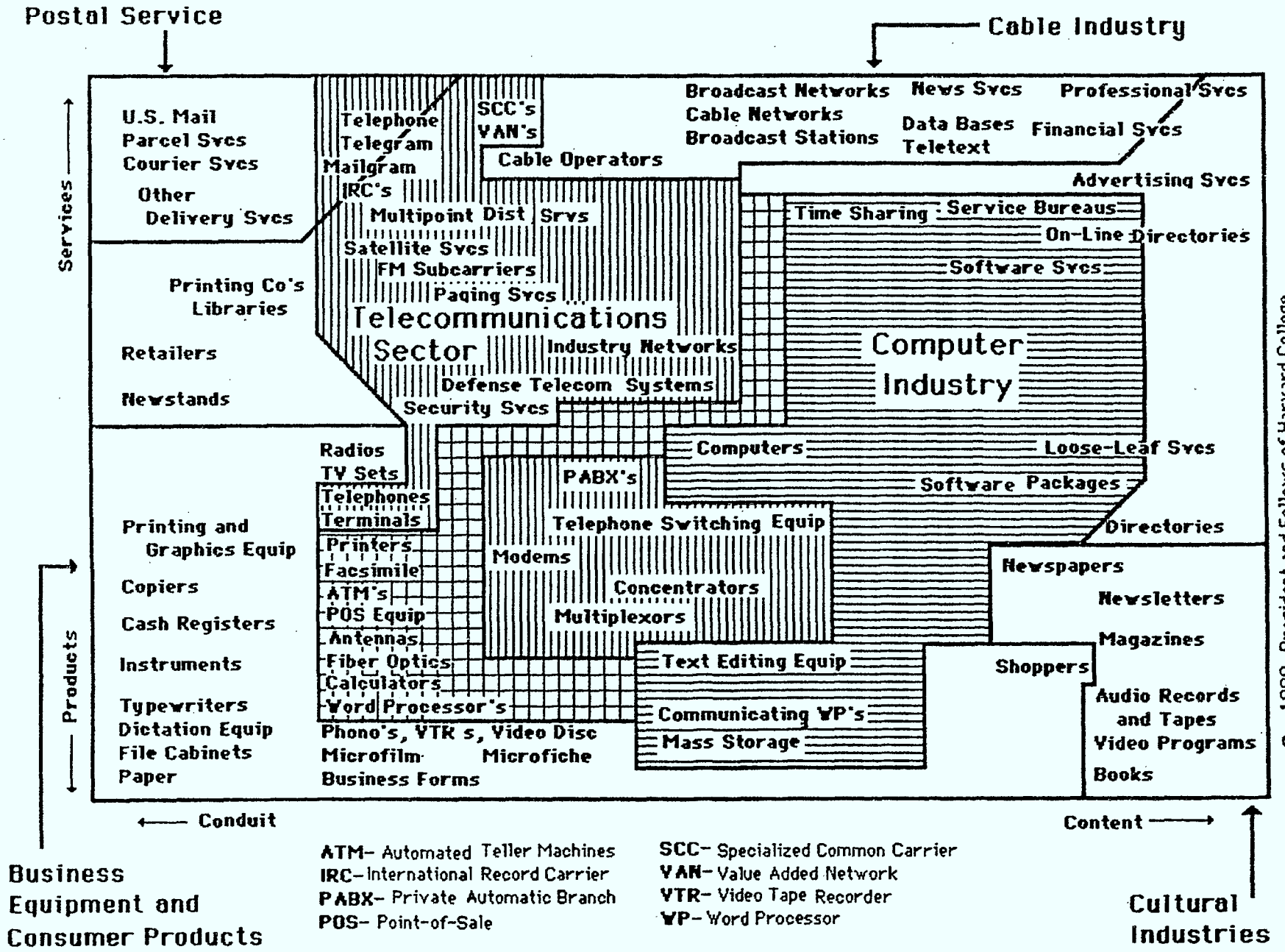
1.4 The Telecommunications Sector as Part of the "Information Business": Internal Characteristics, Policy Setting, and Choice of Policy Instruments

Before proceeding directly to treat the problem of reconciling increased competition to industrial policy, it will be useful to examine the telecommunications sector in Canada in some greater detail. In order

to understand the impact and overlap of policies and the changing use of policy instruments, one must first have a suitable framework for analysing the sector where those policies and instruments are at work. The telecommunications sector in Canada could be conceptualized narrowly to include only the major telecommunications carriers and equipment manufacturers but such a restrictive conceptualization would be profoundly misleading and would not give us proper scope for examining the IC/IP problem. We have therefore chosen to conceptualize the telecommunications sector as one element, though a very major one, within the emerging "information business". After briefly elaborating the concept of "information business" and situating the telecommunications sector within it, we will then summarize the main internal characteristics of Canadian telecommunications. Subsequently, we will then treat the policy environment within which Canadian telecommunications operates and specifically the interaction between telecommunications policy and other government policies and programs. And finally, we will outline the major policy instruments open to government in dealing with the telecommunications sector.

The concept of the "information business" originates out of the work of Anthony Oettinger and his colleagues at the Harvard Program on Information Resources Policy. He and his colleagues look at the "information business" in terms of the major technologies whereby information is created and disseminated in modern society and they have developed a matrix of some eighty technologies upon which various factors can be mapped. [McLaughlin and Birinyi, 1980] Figure I utilizes their graphic representation of the "information business" to map the Canadian situation and the major actors in terms not only of their major areas of

FIGURE 1:
THE "INFORMATION BUSINESS"



involvement but also the rough magnitude of each industry sector relative to other industry actors. As can be readily seen, the telecommunications sector presently dominates the "information business" but is increasingly drawn into competition over particular products or services with other industry actors like the cable companies, the post office, the business equipment industry, the broadcasting industry, among others. Most importantly, however, there is an increasingly major overlap between the telecommunications and computer industries. As well, within the Canadian telecommunications sector itself, internal competition is already well established with regard to certain services such as private line communications, data communications, and cellular mobile radio as well as in the manufacture and sale of telecommunications equipment and terminal attachment devices. It should be stressed, however, that there is nothing fixed and unchangable about either the range of actors identified or the space which each occupies, since volatility and variability are very much a central characteristic of the "information business". [Oettinger, 1981]

Internal Characteristics. For this project, we propose to examine four elements within the "information business" in Canada, the telecommunications carriers and equipment manufacturers, which together comprise what we have referred to as the "telecommunications sector", and the computer and office equipment manufacturing and computer services industries which we will call the "informatics sector". Table I sets out the major internal characteristics of both the telecommunications and informatics sectors in Canada. The telecommunications carriers include all the major telcos operating under federal or provincial jurisdiction and most of whom are grouped together in Telecom Canada; CNCP Telecommunications; Telesat Canada; and Teleglobe Canada. All of these companies operate at least in part in a regulated monopoly situation under

TABLE I : THE TELECOMMUNICATIONS AND INFORMATICS SECTORS IN CANADA**

CHARACTERISTICS	Telecommunications Common Carriers	Telecommunications Equipment Manufacturers	Computer and Office Equipment Manufacturers	Computer Services Industry
INDUSTRY STRUCTURE				
*Basic Structure	- regulated monopoly	- vertically integrated	- unregulated, several hundred firms	- unregulated, 170 firms
*Revenues/Shipments	- $8.3 billion	- $3 billion	- $5.8 billion	- $1.35 billion
*Ownership	- 15% foreign control	- largest firms are Canadian-owned	- largest firms are foreign-owned	- predominantly Canadian
*Company Size (Sales)	- Bell Canada, 60% of revenues, B.C.Tel, 12% of revenues AGT, 10% of revenues	- Northern Telecom, $3.3 billion Microtel, $240 million Mitel, $200 million	- IBM Canada, $1.9 billion OEC Canada, $295 million Control Data, $231 million	- 94% earned less than $2 million with Canada Systems Group earning $127 million
EMPLOYMENT				
*Total Employment	- 110,440 workers	- 45,829 workers	- 16,930 workers	- 22,137 workers
*Growth Rate	- approx. 3% per annum	- 4.5% per annum	- 14.4% per annum	- approx. 12.13% per annum
*Wages	- 37.6% of operating revenues	- approx. 33% of revenues	- N.A.	- 39% of operating revenues
*Productivity Growth	- approx. 12% per annum	- approx. 11% per annum	- N.A.	- approx. 9% per annum
INVESTMENT				
*R & D Expenditures	- N.A.	- $614 million	- $80 million (1983)	- N.A.
*% of Shipments	- N.A.	- 20.8%	- 7% of shipments	- N.A.
*Capital Expenditures	- $2.9 billion	- $210 million	- $103 million (1983)	- N.A.
*% of Shipments	- approx. 10%	- approx. 7%	- 9% of shipments	- N.A.
EXPORTS/IMPORTS				
*Exports	- N.A.	- $936 million	- $1.19 million	- 5% of industry revenues
*Imports	- N.A.	- $585 million	- $3.1 million	- N.A.
*Major Trading Partner	- N.A.	- U.S. with 58% of exports & 76% of imports	- U.S. with 90% of exports & 85% of imports	- U.S. but specifics unavailable
*Trade Balance	- N.A.	- $351 million	- $1.9 million	- N.A.
WORLD STANDING				
*Domestic Production	- $8.3 billion	- $2.2 billion	- $1 billion	- $1.35 billion
*World Production	- N.A.	- $45 billion	- $64 billion	- N.A.
*Largest Canadian Company	- Bell Canada	- Northern Telecom	- No world-class company	- No world-class company
*World Ranking	- N.A.	- 7th largest in telecom-munications manufacturing but 46th in "information business"	- N.A.	- N.A.

** Based on 1982 statistics

Source: DRIE, Background Paper for the Information Technology Task Force (July, 1984); and DOC, The Supply of Communications Equipment (May, 1984).

either federal or provincial jurisdiction. Of total carrier revenues of $8.4 billion in 1982, Bell Canada accounted for 60% of industry revenues while B. C. Tel and Alberta Government Telephones trailed with 12% and 10% respectively. Ownership within the sector is largely in private, Canadian hands, although the provincial governments own the telcos in each of the three prairie provinces while B. C. Tel and Quebec Tel account for 15% of the country's telephone lines and are owned by U.S.-based GTE. Employment with the industry is substantial, standing at 110,000 in 1982 but, in recent years, employment growth has lagged well behind revenue growth. Moreover, productivity as measured by revenue per employee has been increasing steadily while rates of investment growth have been running as high as 11% annually. Thus, the telecommunications carriers in Canada continue to be major employers, highly capital-intensive, and leaders in revenue and productivity growth. [DRIE, 1984; DOC, 1984]

The telecommunications manufacturing industry is also a stable and highly successful industry in Canada and, obviously, linked to the domestic carrier industry but also increasingly oriented towards exports. As of 1982, it was composed of Northern Telecom and half dozen other major manufacturers like Microtel and Mitel with revenues of over $100 million, about 30 or so medium-sized firms operating in particular market "niches", and a larger number of smaller and even more specialized firms. Of a total of $4.4 billion in world sales by Canadian telecommunications manufacturers, Northern Telecom accounted for just under 70% and its revenues were more than ten times larger than the second largest manufacturer. Ownership is predominantly in Canadian hands with the major exceptions being Microtel which is U.S.-owned and Mitel which is now controlled by British Telecom. Employment within the industry stood at

almost 46,000 but has been growing considerably more slowly than revenues while productivity per employee has increased substantially. The telecommunications equipment industry is highly technology-intensive and capital-intensive, with R & D expenditures running at 20% of shipments and accounting for one third of all manufacturing R & D in Canada while capital expenditures run at 7% of shipments. After having a negative balance of trade prior to 1978, exports of telecommunications equipment have grown dramatically and Canada now has a substantial trade balance in the area, with about 60% of exports going to the United States and the remainder spread among a variety of other trading partners while imports of equipment stand at only about 30% of exports. In world terms, overall Canadian domestic production was estimated at $2.2 billion in a $45 billion market, placing Canada sixth behind the U.S., Japan, France, West Germany and the U.K., in a market which was expected to double to $90 billion by 1990. Nevertheless, it is easy to see why the telecommunications industry is viewed as a model to be envied within Canadian manufacturing. [DRIE, 1984; DOC, 1984]

What we have called the "informatics" sector includes both the computer and office equipment manufacturing industry and the computer services industry. In overall size, the computer and office equipment industry is roughly the same size as the telecommunications manufacturing industry but its internal characteristics are quite different. The industry in Canada is composed primarily of a group of subsidiaries of the major multinational computer corporations with IBM dominating this group as well as a group of smaller and generally Canadian-controlled firms seeking particular market "niches" and operating both in domestic and export markets. Again using 1982 data, IBM in Canada is at least six times larger than any other computer manufacturer and foreign multinationals as a whole

account for fully 90% of industry revenues. Only three Canadian firms - AES Data, GEAC and Gandalf - are listed among the 25 largest firms in the industry and most of these are the wholly-owned subsidiaries of American multinationals. In contrast to the situation in the telecommunications equipment industry, employment within the computer and equipment industry stands at 17,000, and has been growing rapidly, doubling between 1977 and 1982, although most of this growth has been concentrated among non-production employees. R & D and capital expenditures have likewise been growing but not at nearly the same rates as in the telecommunications manufacturing industy, with R & D expenditures still representing only 7% of shipments and capital expenditures a little higher at 9% of shipments. Likewise, the trade situation is also quite different as fully 90% of the industry's exports go to the United States - virtually all of which takes the form of intra-corporate transfers - while imports account for a similar proportion of the Canadian domestic market and, overall, Canada has been running a trade deficit of almost $2 billion for this industry. Canada's computer and office equipment industry is small in a world context, accounting in the final analysis for only $1 billion out of a total world market of $64 billion and which is expected to grow to $200 billion by 1990. It is this latter statistic more than any other which explains why the computer and office equipment is potentially so important to Canada. [DRIE, 1984]

Of much less overall economic importance is the computer services industry in Canada but the industry distinguishes itself on a number of accounts. It is a vastly different than - though obviously related to - the much larger computer and office equipment industry and, in 1982, was composed of over 1700 firms virtually all of which are Canadian-owned and

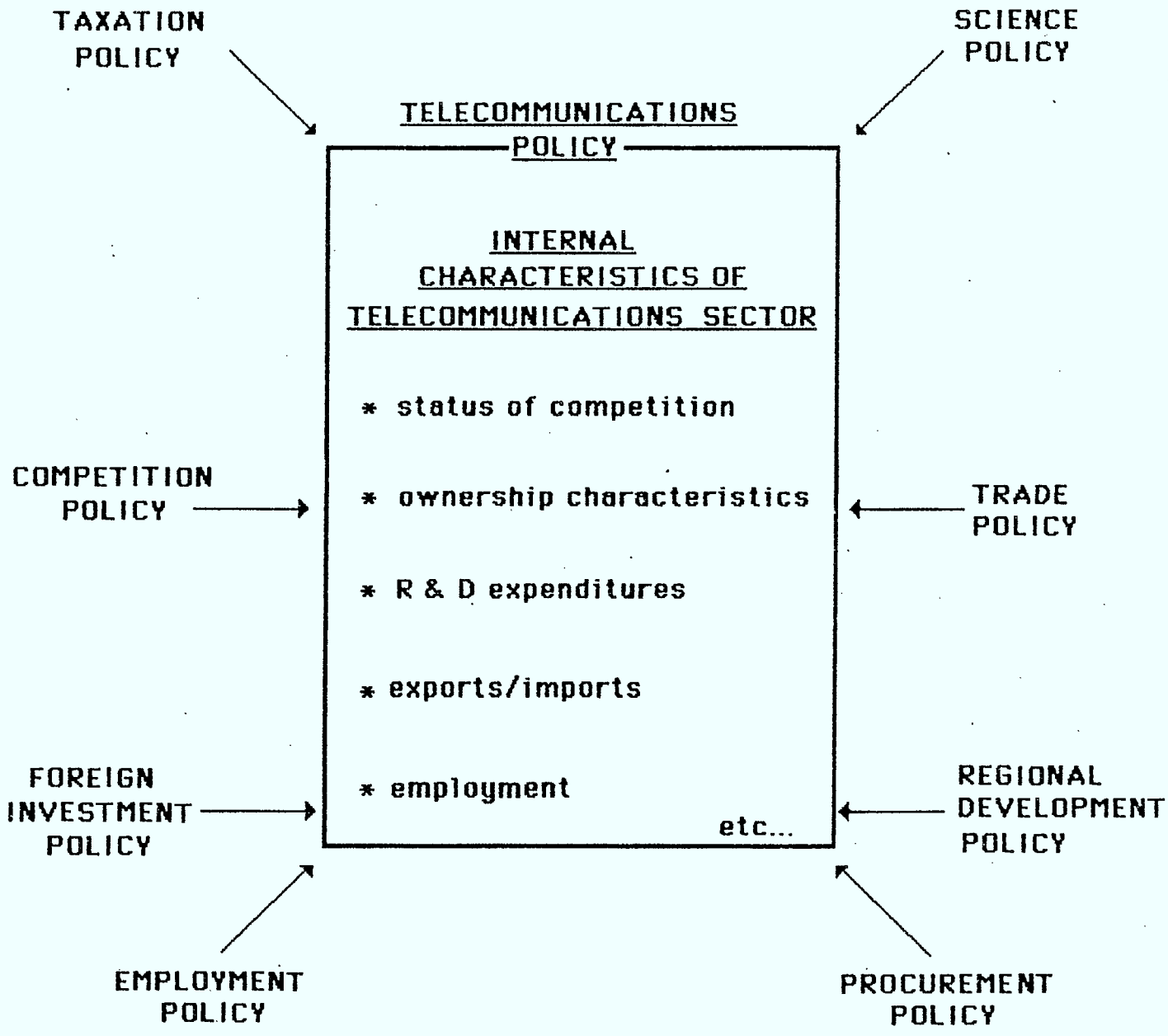
operating service bureaus, consulting professional services and software and systems houses. Industry revenues came to a total of $1.35 billion and growth rates in recent years have been impressive at about 25% annually. The largest firm is Canada Systems Group at $150 million and another 17 companies had revenues of more than $10 million. Employment in the industry stood at more than 22,000 in 1982 and increased only slightly less dramatically over the previous five years than did the computer and office equipment manufacturing industry, although average salaries were considerably lower. R & D and investment figures are less significant factors because of the service nature of the industry and specific figures are not available. Trade in computer services is an increasingly important factor and, while exports are reported at only 5% of industry revenues, the scope of transborder data flows among multinational companies is much more significant and Canada's trade imbalance in the services area is probably extremely large. Thus, while still small in comparison with other elements of the "information business", the importance of the computer services area derives from its overwhelmingly Canadian character and employment potential combined with the unknown future potential for trade in services. [DRIE, 1984]

Policy Setting. The telecommunications sector in Canada has developed over the years within a particular policy setting which, at least in part, has structured and influenced its growth and development. The nature of this impact and the magnitude of this influence is a controversial subject and many observers would argue that the actual impact and influence has been minimal. In this view, telecommunications policy and programs in Canada have never been all that clear or extensive nor have other relevant government policies and programs been tied very directly or explicitly to the growth and development of the telecommunications sector. One looks in

vain for any authoritative government statement of policy objectives for Canadian telecommunications and matters such as increased competition or industrial policy are treated implicitly and without any sense of the priority attached to them. The range of other government policies and programs relevant to the telecommunications sector is potentially extensive especially in the industrial policy area. Other observers, however, argue that the impact and influence of the policy setting has been subtle but more substantial than the opposing view would acknowledge. From this perspective, telecommunications policy - or in some cases the lack thereof - has been decisively shaped by jurisdictional divisions between the federal and provincial governments and also by the need to build and maintain Canadian telecommunications networks and a Canadian presence in the domestic and more recently the world telecommunications market. Moreover, the ongoing federal government policy review is evidence of heightened interest in the area and perhaps presages a more explicit telecommunications policy while, both within government and outside of it, there is a growing recognition of the need to link telecommunications policy more deliberately to other relevant government policies and programs. Our own judgment is that governmental policy, even of the implicit variety identified in the preceeding section of this chapter, has indeed been important to the growth and development of the telecommunications sector in Canada but that increased competition is challenging that implicit policy and forcing government to consider more deliberate and coordinated initiatives. [Woodrow and Woodside, 1984]

Figure II provides a graphic representation of the telecommunications sector and its internal characteristics, the place of telecommunications policy, and the range of other government policies and programs relevant to

FIGURE II: THE TELECOMMUNICATIONS SECTOR: INTERNAL CHARACTERISTICS, POLICY SETTING, AND THE RANGE OF RELEVANT GOVERMENT POLICIES



this area. With regard to telecommunications policy and its potential impact and influence, we intend to pursue our analysis in terms of three frames of reference. First of all, it is crucially important to focus on policy objectives. The identification of clear policy objectives for Canadian telecommunications has been a task which government has been grappling with for many years and its numerous initiatives have not yet resulted in any authoritative outcome even though there have been some promising attempts. In particular, the relationship between increased competition and industrial policy must be a central feature of this exercise. Secondly, clear policy objectives require appropriate organizational structures to achieve those goals. Attention must therefore be directed at how government as a whole and the major departments involved with telecommunications are structured and organized and whether these organizational arrangements are adequate to meet those policy objectives. Again, the relationship between increased competition and industrial policy are crucial to the evaluation of appropriate organizational arrangements. Thirdly, in addition to clear policy objectives and appropriate organizational arrangements, government must also establish some operational principles for formulating and implementing telecommunications policy. Given the predominantly private sector orientation of the telecommunications sector and the importance of intragovernmental and intergovernmental relations, these operational principles become critically important if government wishes to bring about policy change. Yet again, the relationship between increased competition and industrial policy have created the conditions within which serious policy change must be contemplated. It is in terms of these concepts that we will examine telecommunications policy in Chapter Four.

The other side of the coin is the interface between telecommunications

policy and other governmental policies and programs. As we have seen, the debate over industrial policy highlights as one of its main themes the need to orchestrate and coordinate a wide range of governmental policies and programs in order to make effective industrial policy in an area like the telecommunications sector. The range of potentially relevant government policies and programs is extensive but we have identified eight policy areas where the interface seems particularly important to the task of reconciling increased competition to industrial policy in the Canadian telecommunications sector. Competition policy itself is obviously a good starting point and it will be useful to look at how movement towards increased competition in Canadian telecommunications accords with the government's overall approach to competition policy. Trade policy is another important issue because Canadian telecommunications has in the past been a modest but significant sector within Canada's overall trade strategy and one which is very much affected by upcoming multilateral trade negotiations under the aegis of GATT as well as current bilateral trade negotiations with the United States. Employment policy is likewise a most sensitive consideration and it is not clear how important the telecommunications sector might be vis-a-vis the informatics sector in creating new jobs and maintaining old ones. Industrial development policy - as a surrogate really for economic management as a whole - must also be central to our discussion and again it is not always clear how government fits Canadian telecommunications in as part of its macroeconomic strategy. R & D policy is also very much involved and specifically the issue of the balance between public sector and private sector R & D as well as whether subsidy programs, tax incentives or some mix of the two are best able to encourage and sustain R & D in Canada. Foreign investment policy also

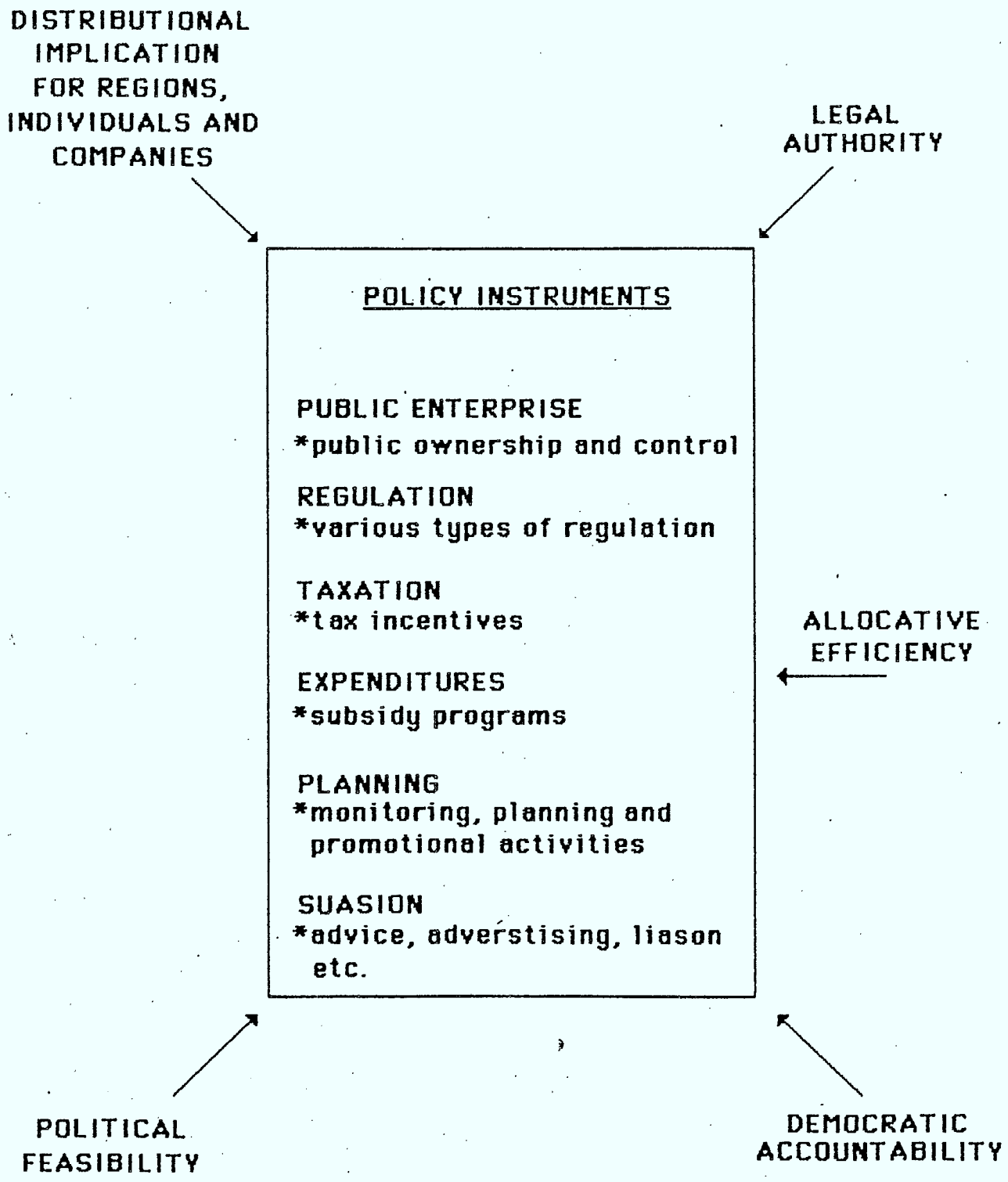
comes to the fore to the extent that the introduction of greater competition domestically and/or limitations on foreign access to the Canadian market are mediated through this process. Regional development policy equally comes to mind because government may wish to encourage the locational distribution of an industry like telecommunications through federal-provincial agreements or government incentives programs. And finally, procurement policy might also be important and quite unintrusive way for government to influence the growth and development of the telecommunication sector in Canada. Each of these eight policy areas need to be investigated in terms of their impact on the Candian telecommunications sector and this will be done as well in Chapter Four.

The Choice of Policy Instruments. Governments cannot always respond in policy or organizational terms to all the numerous events and situations which it must confront on a daily basis. To be sure, it is in general desirable that a clear policy and organizational thrust inform the way in which it reacts and responds to events and situations but it would be unrealistic - and probably undesirable as well - to expect too much direction and coherence in this regard. Policy should be pragmatic as well as principled and the test of good policy is that it contains a judicious mix of both elements. In reacting and responding to events and situations, governments typically reduce the problems they face to a choice among various policy instruments. The policy instruments available to government vary with the event or situation which must be dealt with but, at the most general level, these include public enterprise, regulation, expenditure, taxation, and suasion. A considerable literature has developed around these policy instruments - sometimes called "governing instruments" - which attempts to describe their use and application and to explain why certain instruments are chosen and others are not. [Trebilcock, et. al., 1982]

Public enterprise has been a signally important policy instrument in Canadian history but, rather curiously, has not been all that prominent in Canadian telecommunications. On the other hand, regulation in a variety of forms - by quasi-independent agency, through government departments, or on a private basis by industry itself - have very clearly been central to the development of the Canadian telecommunications sector. Fiscal instruments - taxation as well as expenditure - are likewise part of the pattern with regard to Canadian telecommunications but their use has shifted internally and varied over time. Various types of suasion - understood as efforts to induce appropriate behavior when other instruments are unavailable or deemed to be inappropriate - can also be identified but their pervasiveness and effectiveness are not always that clear. In any case, government can select from a range of these policy instruments and the choice of policy instruments to deal with any particular event or situation can be examined. Several broad-guage explanations for policy choice have been suggested in terms of such factors as the greater or lesser degree of coercion associated with each instrument, marginal political considerations bearing upon the choice process, and other factors. [Doern and Phidd, 1983; Trebilcock, et. al., 1982] Clearly, however, the actual choice of policy instruments on the part of government may also depend more directly on the general approach to policy-making which that government is following as well as the specifics of any particular situation with which it must deal.

Figure II provides a graphic representation of the major policy instruments available to government as well as possible criteria of evaluation which might be applied to each of these instruments. The major policy instruments have been specified both in terms of their general use in the literature on policy instruments as well as in a revised form which

FIGURE III: MAJOR POLICY INSTRUMENTS AND CRITERIA OF EVALUATION



we regard as more useful in its application to analysis of the telecommunications sector. Among the criteria of evaluation set out, most are quite self-explanatory. Legal authority relates to whether government holds the appropriate statutory or other authority to use a particular instrument in a particular situation. Allocative efficiency is an economic criterion which refers to whether or not the use of a particular instrument accords with an optimal or near-optimal allocation of resources. Distributional implications refer to the particular impact which use of policy instruments might have on particular groups within the population. Accountability refers to how well a policy instrument accords with basic norms of democratic government and process. And finally, political feasibility refers to whether and to what extent the use of an instrument fits with the political preferences and judgments of those in government who are responsible for making the relevant decisions. Obviously, no policy instrument is likely to score high on all criteria nor are all criteria likely to be relevant to any particular decision. As well, the conceptual separateness of each policy instrument is not absolute and one policy instrument can meld into another in particular situations. Likewise, public policy and even individual decisions can involve a mix of policy instruments which are viewed as most appropriate to any issue or situation. In dealing with the IC/IP problem at both the policy level and in terms of particular situations, we have found very clearly that government cannot rely upon any particular policy instrument and must usually think in terms of a mix of policy instruments.

1.5 Reconciling Increased Competition to Industrial Policy: Specifying The Problem

If increased competition from whatever source is the dominant trend within the "information business" and if traditional industrial policies

for the telecommunications sector are under attack what can government do to deal with this problem? How might increased competition be reconciled in various ways to appropriate industrial policies? Reconciliation thus should be a key policy concern for government and industry alike and various ways of reconciling increased competition to industrial policy should be explored as an explicit objective of telecommunications policy in Canada. Our interviews with over 50 government and industry officials over the past few months have demonstrated that the problem is a real one and the difficulties of pursuing such a reconciliation are substantial. For analytical purposes, we see this reconciliation of increased competition to industrial policy as taking place on at least three levels:

1) a meta-policy level which relates to the basic approach which government chooses to take in establishing policy and dealing with this specific problem;

2) the macro-policy level where government must decide on a proper overall specification of competition and industrial support objectives for telecommunications policy and complement these with appropriate use of other government policies;

3) the micro-policy level which relates to the changing application of policy instruments in dealing with specific cases where the impact of increased competition on industrial policy becomes manifest.

Each of these levels on which such a reconciliation takes place will now be explored in greater detail.

In simple terms, meta-policy refers to "policy about policy", i.e. what approach does government choose to take to policy-making itself and the application of policy in dealing with the particular problems which it faces. Subject of course to constitutional and other limitations, it is the Cabinet composed of elected M.P.'s from the same political party and the individual Cabinet minister holding responsibility for a department which establish a government's approach at the meta-policy level. With

regard to telecommunications and other areas of responsibility, it has become apparent that the Progressive Conservative government takes a somewhat different approach to meta-policy than did its predecessor Liberal government. Although more a matter of degree than of kind, the core of the difference lies in alternative views about the capacity and desirability of government to develop and implement explicit policy initiatives for a predominantly private-sector activity such as telecommunications. As was most clearly evident in the Minister of Finance's economic statement of November, 1984, the government stated its intention to rely more on broad "framework" policies rather than sectoral strategies, to place greater emphasis on consultation and liaison with industry and public-interest groups in developing and implementing policy, and to follow a general disposition towards initiatives such as fiscal restraint, privatization and regulatory reform. [Minister of Finance, 1984] In short, the government strongly signalled its intention to take a "hands off" rather than a "hands on" approach to policy and action in an area like telecommunications. On this meta-policy level, the prerogative of government to pursue a "hands off" approach to telecommunications must be taken as a given and there can be no real need or possibility of pursuing the reconciliation of divergent policy thrusts like increased competition and industrial policy considerations.

On the macro-policy level, however, there is much greater scope for treating the reconciliation of increased competition to industrial policy goals in the telecommunications field. The macro-policy level subsumes the government's telecommunications policy per se, both explicit and implicit, as well as those other government policies which impact upon the achievement of major policy objectives. In spite of an attempt to set down explicit policy objectives in the proposed telecommunications legislation

introduced but not passed by Parliament in the 1970's, telecommunications policy objectives in Canada remains largely implicit rather than explicit. This does not mean, however, that policy objectives do not exist nor that they do not influence how the federal government deals with particular situations. Among the policy objectives which have underlain government policy with regard to telecommunications over the years have been such objectives as maintaining the integrity and reliability of the overall telecommunications network, encouraging "universal service" at fair and equitable rates, utilizing entry, price and rate of return regulation to discipline the "natural monopoly" characteristics of telephone service, encouraging technological and service innovation in responding to the needs of telecommunications users, and supporting Canadian carriers and equipment suppliers in the provision of telecommunications goods and services, among others. Notwithstanding a significant degree of continuity, the precise specification of policy objectives for telecommunications will vary somewhat over time and according to the government in power and the Minister in charge as well as the priority given to one policy objective vis-a-vis other policy objectives. Increased competition within the telecommunications sector and the broader "information business" constitutes a way of pursuing many of these policy objectives which differs substantially from how these objectives have been pursued at least up to the 1980's and, specifically with regard to the industrial support objective, poses a basic challenge to the traditional industrial policy assumptions accepted in previous years.

There are three logical possibilities for reconciling increased competition to industrial policy at the macro-policy level, two of which represent extreme positions and the third which lies somewhere in the

middle between these extremes. On the one extreme, it is possible to adopt the policy that increased competition should be Canada's industrial policy for the telecommunications sector and the broader information business. In this formulation, increased competition arising from its major sources - technological advance, relaxation of domestic regulatory practices and international market competitiveness - would be accepted as not only inevitable but inherently desirable as the dynamic whereby the Canadian industry could be encouraged to become more efficient and agressive and the benefits of better and cheaper telecommunications service could be diffused throughout the national economy. Making increased competition the dynamic behind the government's telecommunications policy and the ancillary policies which impact upon it would require a number of dramatic breaks with past and present policies:

* existing forms of economic regulation for the telecommunications sector (entry, price, rate-of-return, etc.) would have to be severely curtailed if not totally eliminated;

* attempts to use telecommunications to serve national or social objectives through mechanisms such as flat-rate pricing and cross-subsidization of local service by long distance service would have to be reversed;

* acceptance of vertical integration between major carriers and their preferred equipment suppliers (the Bell Canada - Northern Telecom and B.C. Tel - Microtel relationships) would have to be rethought both in terms of its impact on alternative domestic and foreign suppliers and its effect on Canada's positioning in export markets;

* a major emphasis would be placed on trade policy - multilateral as well as bilateral - designed to allow competitive Canadian companies to break into and maintain themselves within North American and world telecommunications markets;

* a wide range of government industrial support programs for firms in the telecommunications and informatics sector - research and development, regional development, market enhancement, procurement, etc. - would likewise have to be reexamined and either jettisoned or justified on other grounds;

* and finally, there would have to be a virtually complete acceptance of the notion that there should be no substantial barriers or limitations on firms competing in domestic markets, that foreign

> firms should have full access to the Canadian market just as Canadian firms should have full access to the markets of other countries, and that government should defer to market solutions wherever possible.

This extreme position that competition should be the core and compulsory dynamic behind industrial policy relating to the telecommunications sector is espoused by some academic and other observers, by some business interest groups and by a few politicians and bureaucrats within government but does not represent the view of the majority of those whom we have interviewed. Moreover, it is difficult to see how the federal government - even with its "hands off" approach to policy - could pursue this way of reconciling increased competition to industrial policy systematically given domestic political pressures not to mention federal-provincial and international constraints. Nevertheless, the need to acknowledge and encourage increased competition within the telecommunications sector is strong and will necessarily have a substantial impact on the mix of industrial policy and actions which the present federal government is likely to pursue in the coming years.

At the other extreme is quite a different possible way of reconciling increased competition to industrial policy in the telecommunications sector. This would entail the development of an explicit industrial strategy for the telecommunications and informatics sector either as a discrete sectoral initiative or as part of an overall national industrial strategy. The industrial strategy option is premised upon the notion that Canada has been able over the past 20 years or so to develop an indigenous, innovative, and internationally competitive telecommunications manufacturing capability and that this base should be used to extend that capability into the broader "information business" in Canada where its capabilities are considerably weaker and at the same time to expand

aggressively into the world telecommunications market. Formulating and following an explicit industrial strategy for telecommunications would also require government to break with past and present policies in important respects:

* current pressures for increased competition would have to be resisted at least insofar as they challenged the essential monopoly control exercised by the telcos in local and long distance service as well as the prevailing vertical integration with prefered equipment suppliers;

* regulation of the telecommunications industry would likely be expanded to allow for more effective national control and to apply more broadly to the "information business" while efforts at privatization which would leave government with even less control over the sector would have to be rethought and perhaps reversed;

* research and development to promote innovation would have to be given much greater and more systematic attention and tax incentive and subsidy programs would be used much more extensively to promote the creation and birth of "high-tech" firms prepared to operate not only in domestic but even more importantly in export markets;

* outside access to the Canadian telecommunications and informatics market would have to be strictly guarded through foreign investment review, non-tariff barriers, procurement and other vaguely protectionist measures while Canadian access to export markets would have to be aggressively pursued through multilateral and bilateral trade agreements, export financing schemes, trade promotion activities, and appropriate monetary policies, etc.;

* government itself would likely become a more active player in the telecommunications and informatics area - mounting its own innovation programs, picking "winners" among private sector firms, and generally expanding its planning and promotional activities in the field;

* and finally, telecommunications policy would have to make industrial strategy the explicit objective and top priority among government policy objectives and related government policies for employment, regional development, foreign investment, procurement, etc., would have to be harnessed to support this objective.

If the possibility of allowing competition to become Canada's exclusive industrial policy in the telecommunications sector is probably not acceptable, then the likelihood that an explicit industrial strategy might be adopted is even less likely. Not only is the trend of present government policy decidely against such an option but the domestic

political pressures and federal-provincial and international constraints are much more formidable. The explicit industrial strategy possibility is clearly an extreme one and has primarily heuristic value on any current policy agenda within government, even though specific elements of the industrial strategy option retain credibility among some government departments and a few private sector actors. What is more to the point is whether the implicit industrial policy elements followed in past and present government policy can and/or should be maintained in the face of pressures for increased competition.

Between these two extremes, there exists a middle ground which comprises different degrees and forms of competition allied to different mixes of industrial policy considerations. The ongoing telecommunications policy review now being conducted by the federal Department of Communications is engaged very much in determining what the proper degree of competition and mix of industrial policy considerations should be. Without attempting to preempt either the Department's role as policy advisor or Parliament's ultimate responsibility for public policy, our research and interviews suggest that eventually policies will tend to evolve more towards acceptance of increased competition as the prime dynamic underlying telecommunications policy but with considerable regard for existing industrial policy considerations. Industrial policy considerations will necessarily be acknowledged as an important objective among telecommunications policy objectives, although only a secondary objective behind such objectives as economic efficiency and protection of the consumer. Trade policy, research and development, tax incentives as opposed to subsidy programs, and procurement policies in addition to continued support for vertical integration within the telecommunications

sector are likely to be the most sensitive areas where this reconciliation of increased competition to industrial policy is likely to take place. It is within this middle ground between the two extreme positions outlined above that government policy is being shaped and that this study will concentrate its analysis, especially in Chapter IV.

Finally, there is the micro-policy level on which any reconciliation of increased competition to industrial policy takes place. The micro-policy level relates to how specific cases where conflict between increased competition impacts upon industrial policy considerations and typically involves the changing application of the various policy instruments available to government. One point of clarification as to the relationship between macro-policy and micro-policy should be made: no statement of government telecommunications policy nor any particular specification of policy objectives can adequately deal with the complexities of dealing with individual situations. At the micro-policy level, the impact of increased competition on industrial policy in the telecommunications sector gives evidence of numerous manifestations and variations as we will demonstrate in Chapter II. It would be wrong to assume that all of these situations can be handled through the application of a single policy response. A second point is also important and this relates to the range of policy instruments available to government in responding to such situations. Governments are generally understood to hold a variety of different policy instruments in their hands - public enterprise, varying types of regulation, expenditure programs, tax incentives, suasion, etc. - and governments often have to tailor and mix the use of these policy instruments in order to deal with the particular situation which confronts them. At the micro-policy level, then, the problem of reconciling increased competition to industrial policy in the telecommunications sector

can be examined in terms of the government's changing selection of policy instruments in light of its meta- and macro-policy orientation and as evidenced in how it uses specific policy instruments in situations where the IC/IP problem manifests itself. It is to these micro-policy issues of policy instruments that we will turn in Chapter V.

In order to proceed with this analysis, it is necessary to modify the traditional rendering of the policy instruments analysis somewhat so as to tailor it to specific application to government activity in the telecommunications sector and the broader "information business". Public enterprise per se is too narrow a concept to capture the degree of government involvement in this area where only the Prairie provinces own their telephone systems and government ownership or partial ownership at the federal level is limited at present to Teleglobe, Telesat, Canadian National's holding in CNCP Telecommunications and the Post Office. By specifying the instrument as government ownership or control, however, this instrument can be expanded to refer not only to the ongoing debate on privatization but also to the utility of government-directed programs such as DOC's Telidon and Office Communications Systems programs. Regulation is also a policy instrument which subsumes a number of different variations whether these be decisions by the CRTC as a quasi-independent regulatory agency, licensing activities by DOC, or the application of framework legislation in the foreign investment or competition policy areas. Expenditure programs applicable to the telecommunications area such as research and development or regional development subsidies as well as tax incentives such as the former Scientific Research Tax Credit or relevant locational incentives both go towards the same purpose and appear to be the same policy instrument but really are two distinct policy instruments -

public expenditure as distinct from taxation - and will be analysed separately. A fifth policy instrument - and one which has been added to our analysis - is the planning, promotional and monitoring activities which government undertakes in developing and implementing telecommunications policy and programs. This activity is not usually identified as a policy instrument on its own but is actually an organized form of suasion which can be utilized by government. As well, other more traditional forms of suasion - advice, liaison, advertising, etc. - can also be used by government to achieve its policy objectives. Each of these five policy instruments has its own particular strengths, weaknesses and performance characteristics and each can be assessed in terms of the appropriateness of their use according to a number of criteria of evaluation set out in Diagram III.

CHAPTER TWO: MANIFESTATIONS OF THE INCREASED COMPETITION / INDUSTRIAL POLICY PROBLEM: TEN SITUATIONS IN SEARCH OF RECONCILIATION

Up to now, we have treated the problem of reconciling increased competition to industrial policy in the telecommunications sector at a fairly general level. In this chapter, we propose to make that treatment more specific and concrete by canvassing a number of situations - 10 in all - where the potential conflicts between increased competition and industrial policy can be seen more clearly and in their varied manifestations. The situations we have identified arise from our background research as well as from our interviews and each situation has necessarily been simplified and is sometimes a composite of varying elements. Nevertheless, these situations provide good and relevant examples of the increased competition / industrial policy problem, the basic concerns which each situation raises, and the range of options open to government in dealing with each situation. As well each situation raises good and valid questions about how government is going about dealing with the IC/IP problem.

SITUATION #1: CRTC Decision-Making and the Opening-Up of New Telecommunications Markets: Terminal Attachment, Enhanced Services, Resale and Sharing

The CRTC as the responsible regulatory authority has until now maintained effective barriers to entry vis-a-vis the local and long-distance telephone monopolies within federal jurisdiction. In a series of decisions over the past five years, however, the Commission has consistently opened up more specialized telecommunications and information markets to increased competition. [Dalfen, et. al., 1982; Woodrow and Woodside, 1984] In 1980, it issued an interim terminal attachment decision - subsequently confirmed and extended in 1982 and 1984 - which allowed business and residential customers to attach non-telco equipment to the

network, subject only to technical standards criteria, and by dropping barriers to entry effectively created a new interconnect market among sellers and suppliers of such equipment. [CRTC Telecom Decisions 80-13; 82-14 and 84-14] In 1984, another CRTC decision on enhanced services - i.e. value-added services like electronic mail, data base retrieval, or interactive systems among others - opened up this area to competition among established telcos and other service providers through a form of segmented regulation whereby telcos would continue to be regulated for carrier purposes while the non-carrier enhanced service providers would generally be unregulated though subject to the tariff conditions for leased lines. [CRTC Telecom Decision 84-10] And most recently in 1985, in its response to cross-border resellers and in the resale and sharing section of the recent CNCP interexchange decision, the CRTC used a similar form of segmented regulation to allow for non-telco companies to resell to other users and/or share the use of long-distance service purchased at discount rates from the telcos but within a tight set of rules. [CRTC Telecom Decision 85-19]

In each of these cases, CRTC regulatory decisions have resulted in the creation of new competitive markets within the telecommunications sector. Following the 1980 decision, a vibrant but undisciplined interconnect market quickly emerged in Canada with up to 100 or so companies competing to manufacture and sell terminal equipment. [Lilley, 1981; Hough and Associates, 1981] During 1982 and 1983, that market underwent the anticipated "shakeout" as the established telecommunications companies began to assert their market power and many of the smaller firms either were taken over or went out of business. As of 1984, the interconnect market in Canada was valued at $300 million per year, with 47% of sales

divided up among the four largest firms (Bell Canada System Inc., Rolm, CTG and Terminal Telecommunications System) and much of the supply market provided by a number of different companies both domestic and foreign. [Northern Business Intelligence, 1984; ICA Telemanagement, 1984] Available studies of the interconnect market - both at the time of its emergence and more recently - suggest that it is only a moderately-good job-creator, involves relatively little R & D work, relies substantially on offshore manufactured products, and is looking increasingly towards foreign as well as domestic sales.

Enhanced services is not yet a market at all but rather separate services like electronic mail, database retrieval, and interactive videotex, among others and these services may be provided competitively by the telcos and other service providers. [Knoppers and Neogi, 1982] For example, electronic mail services are presently being provided in Canada in a number of formats by Telecom Canada and its members, CNCP Telecommunications, Canada Post, and more recently by courier services and the demand for electronic mail services is beginning to pick up. Database retrieval services also take several different forms including Telecom Canada's Inet 2000 service, non-telco Canadian services like Info Globe, I.P. Sharp and QL Systems, as well as a number of U.S. services and the database retrieval market is expanding rapidly. With regard to interactive services like videotex, teleshopping, or point-of-sale debit transactions, the market has been much slower to develop than expected and neither the telcos nor the cable companies have gone much beyond field trials to actually compete for customers. [Douserv, 1983; Lesser, 1985] What would really firm up the enhanced services segment, however, is if a major computer communications company like IBM - which in the U.S. has already entered the telecommunications carriage market - were to move agressively

into the provision of some of these services and raise the issue forcefully as to how to separate computers from communications for policy and regulatory purposes.

Resale and sharing are also services which have now been sanctioned by regulatory decision but for which a stable market has not been established. Companies engaged in this activity perform an arbitrage function, buying private line or other services at a substantial discount and offering it to users at less than the normal rates. The resale market has become reasonably well established in the United States but, in Canada, there have been only a few isolated examples such as Cam-Net or Long-Net which provide discount service to the United States. Sharing of services among users is likewise quite limited in Canada although it has become more extensive in the United States in various forms such as "smart" buildings and "teleports". Recent studies of the potential for resale and sharing in Canada are cautious and inconclusive and the future of resale and sharing depends very much on whether bulk rates continue to be much cheaper than straight long-distance charges. [Goss, Gilroy & Associates, 1984; Techno-Economic Research Unit, 1985]

The major issue posed by this situation is whether regulatory decision-making by a quasi-independent agency should be relied upon to create and structure new telecommunications markets such as the ones described above. Can the CRTC as it presently operates take industrial policy considerations effectively into account? Are the competitive "rules of the game" which it has established for these three markets realistic and optimal in promoting the development of these markets? Remember that individual firms are not seeking licences to operate within any of these markets and therefore they do not come under regulatory scrutiny on an

individual basis. Rather, the CRTC in the course of its issue hearing and subsequent decision is on its own and perhaps without adequate knowledge establishing "rules of the game" for these emerging markets. [Woodrow and Woodside, 1984] Were satisfactory market analyses conducted by the CRTC prior to their decision? What continuing commitment and responsibility should the Commission have for the ongoing operation and financial health of these markets? Given the fact that such markets may have serious industrial and other implications, might it not be better if the federal government through the Minister of Communications were to introduce competition as a matter of policy rather than as a by-product of quasi-independent regulatory decision-making? Is this not an area where the power of policy direction could be used effectively? While there is no evidence to date that the regulatory decisions creating any of these markets have gone seriously wrong, the potential is there and questions of efficiency and accountability in the exercise of the regulatory instrument should be confronted.

SITUATION #2: "Bypass" In Its Various Forms - Domestic as well as Foreign - and Their Industrial Policy Implications

"Bypass" has become an important buzzword in telecommunications during the 1980's and a source of continuing controversy as to the threat and reality of this phenomenon presently and in the coming years. In its simplist and most common-sense meaning, bypass refers to various different efforts to use new and improved technologies or alternative modes of providing the local and long distance services presently offered on a monopoly basis by the major telcos across Canada. The starting point for analysing the phenomenon must rest with the existing public-switched network and the policy and regulatory framework which underlies it and, with this in mind, bypass can be seen to take several forms. [Business

Week, 1984; Flax, 1984; Economist, 1985] The most straightforward form of bypass occurs when a telecommunications provider like CNCP Telecommunications or any other potential entrant, using predominantly its own network and with or without compensation, seeks to offer services in competition with the telcos, such as has been the case with regard to private line services since the 1950's and as was rejected for toll service in the recent CRTC interexchange decision. [CRTC Telecom Decision 85-19] A second form of bypass relates to the use of modes of distribution alternative to the public switched network - cable distribution systems, local area networks, or privately-leased satellite communications - whereby large business and institutional users, seek to meet their more specialized telecommunications needs by going outside the established telephone network. [KVA Communications and Electronics Co., 1985] Yet a third form is foreign bypass where resellers like Cam-Net and Long-Net in British Columbia offer service using foreign facilities to compete with the telcos in offering transborder and even domestic long-distance service. [CRTC Telecom Decision] Whatever the form bypass may take, the prime condition underlying the phenomenon is not only the availability of appropriate technology but also prices charged by the Canadian telcos which are substantially above the costs of providing equivalent service.

The threat and reality of bypass in Canada is a matter of some contention. Virtually all recent accounts suggest that the United States is presently undergoing a "bypass explosion". [Brock, 1984; Bolter, 1985] In Canada, however, the situation may be somewhat different. Bypass is presently most acute in Canada in the area of long-haul transmission as was evidenced by CNCP proposal to provide competitive long-distance service as well as the scattered instances of routing calls through non-Canadian

facilities. In the longer-term, however, bypass may also operate in the local service area but this is probably some years off. Our research and interviews suggest that the potential for bypass is serious in Canada, especially because of prevailing pricing practices for long distance service, but easily overstated when viewed in terms of the U.S. experience. [Peat Marwick & Associates, 1984; Ford & Associates, 1984] As is usually the case with respect to major policy trends, Canada will likely track the U.S. experience but on a more delayed basis, subject to considerably greater variation across the country, and within a tighter framework of policy and regulation. There are at least three reasons for this conclusion: first of all, bypass is predominantly a threat in Bell Canada or B. C. Tel territory, and thus poses a direct challenge to federal policy and regulation, but is only likely to affect other provinces indirectly; second, the capacity and disposition of policy-makers and regulators at both the federal and provincial levels in Canada to attempt to control bypass is considerably greater than in the U.S.; third, the incentive to move towards bypass on the part of large users in Canada is diluted but by no means eliminated by the fact that so many institutional users are public sector organizations which must directly or indirectly serve provincial or federal government purposes while many business users are not yet as well organized to pursue bypass on their own behalf as are their U.S. counterparts. [Woodrow and Woodside, 1984]

Despite the fact that bypass as an expression of increased competition is not yet acute, its industrial policy implications should nevertheless be considered. Bypass has a number of important industrial policy implications. As the CNCP case shows, bypass necessitates the purchase of "poles, wire and switching equipment" - or at least their high tech equivalent - creates jobs directly and indirectly, and involves some degree

of R & D work. As well, it also raises the matter of duplication of facilities and possible overbuilding of networks, especially given technological advances in switching and transmission which have greatly expanded the capacity of existing networks. [CRTC Telecom Decision 85-19] Likewise, policy questions as to whether cable should be encouraged to move into a carrier mode, whether satellite communications can be an economically viable bypass technology and, given its developmental trend, at what point computer communications might have to be subjected to regulation must be confronted. And last but not of least importance, there is the sovereignty question of whether Canada could accept extensive reliance on foreign bypass networks or even to allow foreign-owned companies like AT & T or MCI to promote bypass technologies within Canada. [Berger and Neogi, 1982] In terms of reconciling the increased competition inherent in bypass to industrial policies in Canada, the key issue is really a planning problem, whether and how much bypass government should allow and in what ways should bypass be controlled in Canada. Can bypass effectively be controlled by government using its present regulatory authority? [Clarkson Tetrault, 1985] To what extent is the bypass option necessary to meet the needs of large users and to promote the efficient use of telecommunications within the national economy? Is rate restructuring to bring down the costs of long distance service really the best way for government to control bypass?

SITUATION #3: DOC Licensing Decisions and Equipment Supply: The Case of Cellular Mobile Radio and Earth Station Ownership

Like the CRTC, the federal DOC has also taken important actions using its policy and regulatory authority to manage competition within certain telecommunications markets. The Minister of Communications is, of course,

responsible for allocation of the radio frequency spectrum as well as for Canada's space activities, both of which powers are exercised nationally unlike the case with regard to the CRTC telecommunications authority. As a matter of spectrum management, the DOC in 1983 announced the licensing of cellular mobile radio service in 23 markets across the country, with the relevant telco - whether federally or provincially regulated - as well as a private company, Cantel Inc. being licensed to provide service on a competitive basis within each market. [DOC, 1983] Likewise, in order to encourage broader use of satellite communications, the DOC in 1984 decided to change its previous policy and allow ownership of earth stations for transmission purposes directly by telecommunications, broadcast and other users whereas previously this equipment had to be owned either by Telesat Canada or a licensed carrier. [DOC, 1984] Each of these strategic initiatives was designed in its own way to promote greater competition in the provision of specific telecommunications services and encourage new or expanded usage of segments of the radio frequency spectrum.

These two decisions also had important industrial policy implications. The cellular mobile radio licensing decision came after a number of applicants had made proposals to offer such a service and DOC had determined that duopoly was the most appropriate market structure for introducing this service. [Canadian Business, 1984] The service has only been available to Canadians since July of 1985 and it is clearly too early to determine how well this managed competition will prove to be. The supply of equipment to Cantel and the relevant telcos was one consideration in the decision. Cantel was originally to purchase equipment from Novatel in Alberta but finally ended up getting that equipment from the Swedish-owned Ericcson. With regard to earth station ownership, the objective of the policy change was to inject more vitality into the slumbering satellite

communications business and to respond to the complaints of large users who wished to be able to operate their own systems. From Telesat Canada's point of view, even though a threat to its present captive market, the decision may accord with their current thinking about dealing directly with customers rather than always going through the telcos or broadcasters. In terms of the earth station equipment supply industry, the initiative is also welcome in diversifying the range of domestic buyers of their product. However, few observers believe that this decision constitutes firm and adequate government support for an ailing sector nor that it does much to solve the broader business and policy problems facing the sector.

In each case, the federal government opted for one form of competition or other as the way to deal with specific situations. Both decisions also raise important industrial policy considerations on a number of different levels. On the more general level, there is the question of whether or not strategic decisions such as those outlined above - decisions which are taken once and for all and where government is not expected to be continuously involved in their implementation - can be used to set the proper industrial policy course. Such strategic decisions are widely preferred by industry, academic and many government officials but do they go far enough in achieving industrial policy objectives. Should the federal government have set tighter equipment supply conditions on its licensing of cellular mobile radio services? Could the sourcing requirements in the Telesat Canada Act be extended to operate in a competitive as well as a monopoly situation? And at a more general level, does the competitive model - whether it be manifest in terms of duopoly or more open competition - deliver the greatest industrial policy benefits in the specific situations outlined above?

SITUATION #4: Government-Directed Innovation Projects: From Telidon to Office Communications Systems

Government has not always limited its intervention to "strategic initiatives" to shape particular markets or more indirect forms of intervention but has sometimes succumbed to the temptation to become directly involved in project managements. Such has often been the case with regard to the diffusion of innovation in the telecommunications and informatics area. Between 1979 and 1985 when federal government participation stopped, the Department of Communications became directly and deeply involved in the development and dissemination of Telidon technology, spending $67 million itself and encouraging the private sector to add another $200 million. [DOC, 1979; Surtees, 1984] Likewise, in a more limited but broadly similar case, the Department also invested $12 million between 1981 and 1985 in the Office Communications Systems project in order to demonstrate and encourage use of integrated office systems within the public sector. [DOC, 1981] These two cases of government-directed innovation projects are examples of a "hands on" approach to the encouragement of innovation and provide good tests of government's planning and promotional talents.

Evaluations of these two government-directed innovation projects are just now becoming available. The Telidon case is clearly the more widely documented but evidence regarding the OCS case is also mounting. Telidon, of course, originated out of R and D work undertaken by the Communications Research Centre, was quickly adopted by prominent departmental officials and the Minister himself, engaged the efforts of a wide range of private sector actors - hardware manufacturers, software suppliers and possible transmission providers - and was overseen by a consultative committee of government, industry and public interest representatives. [Desbarats, 1983;

Creery, 1982] The conventional wisdom about Telidon is that it was largely a fiasco - a superior technology and technical standard but lacking an immediate consumer market, inadequate field trials, complications in getting it established as a world standard, too much emphasis on hardware and not enough attention to content, etc. On the other hand, the videotext market in North America seems now to be picking up somewhat with the entry of IBM into the business, changes in marketing strategy, and greater availability of software. Internal evaluations of the Telidon experience within DOC have also been completed and, to a large extent, sustain neither many of the individual criticisms nor any broad negative assessment of the program. [Interviews, 1985] On one point, however, there is little disagreement and that is that Telidon was oversold - both to the politicians and the public - and that it diverted too much attention within DOC from its basic functions.

Much less grand in conception but likewise a government-directed innovation project, the Office Communications Systems Program has also been a source of controversy. The OCS began in 1980 and was designed, in its first phase, to explore Canada's technological and business capabilities in the burgeoning office automation market in Canada and abroad and then, in its second phase, to demonstrate and test those capabilities through a series of field trials conducted in federal government departments. [Creery, 1982; DOC, 1982] A total of six field trials, each involving different Canadian office automation companies applying their technology in different government departments, were eventually funded and led to mixed success and failure. Evaluations of the OCS which are presently being completed suggest that this program also suffered from a number of weaknesses - the appropriate products weren't always available, the vendors

weren't willing to work together to develop proper integration standards, the test was too small and obscure to attract foreign attention, government did not appear to follow through in terms of subsequent government procurement, etc. [Interviews, 1985] A different line of criticism directed at the OCS program would suggest more that its original conception was off-base and that the goal should have been to demonstrate how various office automation trials could respond to real user needs rather than merely to support the Canadian industry. [Taylor, 1985] Likewise, OCS was very much oversold among politicians and the bureaucracy, although its smaller scale meant that it did not divert DOC attention and energies as seriously as did Telidon.

In terms of industrial policy concerns, these two government-directed innovation projects raise important questions. Should government get directly involved in sponsoring innovation and its diffusion or is this task better left to the private sector? Can politicians and bureaucrats adequately stand back and assess innovation projects that they are directly involved in with the proper objectivity and appreciation of risk so that taxpayers money would be invested in these projects with more or less the same care that private sector investment decisions would be made? Do not splashy innovation projects such as Telidon and OCS divert attention from the more basic planning and promotion activities on which a department like DOC should rightly be concentrating? There is also an implicit assumption underlying government activity on these projects which needs to be appreciated. In both the Telidon and OCS cases, DOC sought to promote competitive application of these technologies by encouraging a wide range of suppliers. Competition among suppliers in circumstances where market demand is not clear can often be destructive and it might be better for government to focus on stimulating the demand side and let companies

respond more naturally to market opportunities. [Palda, 1984] Likewise, these two examples also point to two common problems facing government and Canadian industry as it seeks to operate in the evolving "information business". How can research and development of new products and services be linked more directly and more efficiently to the actual marketing of those products and services? How can the export markets which are so necessary for new product or service development be tapped in addition to domestic markets? And finally, what is the proper role of government in dealing with these problems?

SITUATION #5: Tax Incentives Versus Subsidy Programs to Promote Research and Development or Other Objectives

Canadian governments can choose between tax and subsidy programs in their efforts to spur investment in research and development. Each of these policy instruments - tax incentives and grants - shares much in common as governmental attempts to modify the investment environment but differs in enough other ways that their relative importance as alternative mechanisms has become an area of controversy. [Woodside, 1983] The tax system can be used to provide relief against profits for successful or profitable firms and this instrument is popular because it involves only indirect influence by government in management decisions. Tax incentives, however, are considered to be difficult to target and of little use to firms starting up and in need of immediate cash flow. Grants, on the other hand, involve much more direct governmental involvement in management decisions as officials seek to choose among competing proposals for available financial assistance. At the same time grants are usually seen to be the superior way to assist firms that need initial financial help, much in the fashion of venture capital, and can be readily targeted.

Both instruments have been widely used by the federal government to promote R & D. Most recently the tax code has allowed for the full deductibility of all current and capital expenditures on research and development in the year they are incurred. [McFetridge and Warda, 1983; Mansfield and Switzer, 1985] As well these expenditures have been eligible for an investment tax credit of 20% (30% in the Atlantic region and the Gaspe and 35% for small business) and briefly through 1984 and early 1985 the government made available the Scientific Research Tax Credit (SRTC), a 50% tax credit that was allowed to flow through to investors. The grant or subsidy instrument has also been widely used with an "alphabet soup" of programs evolving to meet a host of different purposes. [Tarasofsky, 1984] Among the multitude of existing grant programs are the Industrial Research Assistance Program (IRAP), the Industrial and Regional Development Program (IRDP), the Defence Industry Productivity Program (DIPP) and the Program for Industry Laboratory Projects (PILP).

By way of example, subsidy programs played a large part in the success of a company like Mitel. Formed in 1973, Mitel began as a maker of small PBXs and has evolved over more than a decade such that it now produces a much broader product line. [Cowpland, 1983; Thomas, 1983] The Special Electronics Fund - later the STEP Program - was virtually designed around Mitel when it was a small firm with revenues of about $20 million. Mitel has continued to benefit from R & D grants, receiving in this way 11.6% of its $242 million spent on research for the period 1980-85. The great success of Mitel until 1983 helped to advance the idea that subsidies were a highly efficacious way to assist and promote new firms to succeed. These subsidies greatly helped Mitel to establish itself in the very profitable niche of small PBXs and later to become one of the major suppliers in the North American telecommunications equipment market. The experience of

another firm, Norpak, was much less happy. Norpak was a major participant in the Telidon program, receiving $21.5 million in grants in this way alone. The present leadership of Norpak takes a very dim view of the use of subsidies largely because of the way in which government becomes involved in management decisions, encouraging companies to behave in ways that could not produce success in the marketplace, and because officials themselves attempt to become entrepreneurs while remaining within government.

The tax system provides an alternative vehicle for the delivery of government assistance. Northern Telecom and Gandalf are two firms that have largely eschewed subsidy programs, preferring to depend on the tax system as its avenue for assistance. For the most part Northern Telecom has not been a recipient of government grants, preferring to avoid the kind of managerial interference it would involve and, instead, it has looked to tax relief as its source of governmental financial assistance. In this way it has been able to use its protected market position, based on vertical integration, together with some farsighted and timely investment decisions to develop into a corporate heavyweight. A second successful firm, Gandalf, has also avoided involvement in subsidy programs, again largely out of its belief that sound management decisions could not allow for direct government involvement. Thus, just as Mitel's success provides evidence of the potential for success in the use of subsidy programs, the experience of Northern and Gandalf suggests that some firms prefer to rely on the tax system for their financial assistance.

The recently cancelled SRTC constitutes an interesting attempt to incorporate some of the advantages of grants into a tax incentive. [Loveland, 1984] Introduced in January 1984 and killed a year later, the

SRTC was designed to get money into the hands of those planning R & D investments immediately, indeed before the R & D was in fact performed. In this way problems of cash flow could be met at the time when the investor really needed the financial help while at the same time incurring the promise that it would spend a certain amount on research within the year. At the same time the legislation provided for a quick flip and a double flip so that investors could sell their credits to other firms with sufficient tax liability to make use of the credit. The result was that a market in SRTCs quickly emerged and a tax incentive, initially estimated to cost a modest $100 million, mushroomed into a tax expenditure well in excess of $2 billion. Under substantial media and financial pressure along with questions about the character of the research being funded the incentive was terminated in early 1985. While interesting in its conception, the SRTC proved to be a black-eye for those advocating increased use of the tax system for R & D purposes.

The tax versus subsidy debate has been simmering away now for several years. Government financial assistance must take into account a plethora of circumstances that firms find themselves in - differences in their size, profitability, the competitiveness of their marketplace, available cash flow, the relative size of the planned R & D investment for example - and it would seem that to date no one instrument has really met all these needs. This raises the question of whether these two approaches should really be regarded by government policy-makers as alternative means to achieve the same goal or rather must officials and politicians accept the fact that each has its appropriate area of use. Experience with the SRTC also raises a second dilemma - can tax incentives be properly targeted and designed so that financial aid can be delivered in a timely and efficient fashion or are such hybrid tax provisions beyond the capacity of the tax

system and its administrators?

SITUATION #6: Government Treatment of Canadian Multinationals: The Case of Northern Telecom and Spar Aerospace

In recent years a number of Canadian-based multinational corporations have emerged in the telecommunications and informatics markets to take their place as important actors in the international marketplace. Two such firms are Northern Telecom and Spar Aerospace and an examination of the experience of each of these firms raises some interesting questions about their relationship with the federal government. In particular, can the federal government control the behavior of these multinationals and should it attempt to exercise such control? Alternatively how can the federal government most effectively assist these multinationals so that they can sustain a high rate of growth and do so in a manner that benefits Canada? The realities of the telecommunications and informatics markets are such that there is a built-in impetus toward multinational expansion as successful firms quickly exhaust the opportunities available in Canada and seek to expand into new international markets. Continued and rapid expansion is necessary to finance the expensive R & D activities that are required to maintain their competitiveness. Companies may find it necessary for both political and economic reasons to make sizeable investments in both plant and research in the very foreign markets they seek to service and, as such, can be subject to public criticism for denying the Canadian economy some portion of the benefits of their success. Governments for their part may want to help these firms but they can only justify continued public support where there are appreciable benefits for the Canadian economy.

Northern Telecom has probably been Canada's most successful

multinational over the last decade. Northern's successful emergence dates from a 1958 U.S. anti-trust decision that led to the establishment of Northern as a fully Canadian-owned, vertically integrated subsidiary of Bell Canada and later the 1968 Carterfone decision that began the process of opening up the U.S. equipment market to competition. [Takach, 1985; Northern Business Information, 1984] Subsequently in the 1970's Northern made a crucial strategic decision that the future lay in digital technology and it has built upon this foundation to become a dominant equipment manufacturer in North America. At least in its earlier years the vertical integration of Northern, BNR and Bell Canada was a major source of its strength but during the 1970's Northern and Bell Canada had to fight off an attempt by the Director of Investigation under the Combines Investigation Act to force Bell Canada to divest itself of Northern and thus open up the equipment market to increased competition. The third and final report of the Restrictive Trade Practices Commission supported the continuation of vertical integration, apparently satisfied that Bell Canada paid a fair price for Northern Telecom equipment and placing considerable weight on the role of the Northern-Bell Canada tie as source of strength from the industrial policy perspective. The issue of vertical integration, however, remains an issue both as a U.S. concern in the free trade negotiations and as an impediment to competition within the domestic market.

Spar Aerospace is a second Canadian-based multinational although one that has been somewhat less successful than Northern. Formed in 1968 and initially headed up by a former ADM in the DOC, Spar is active in the areas of defence, space, and to a lesser extent communications. Spar has been widely regarded as a "chosen instrument" of the federal government, virtually a monopoly supplier of Telesat Canada as part of its Canadian sourcing commitment, and a beneficiary of many federal subsidy programs.

More recently, Spar has been attempting with limited success so far to expand into international markets but it still largely depends on the backing of the Canadian government. Indeed, Spar is very much a creature of government subsidy support, an observation that could be made of many firms in its industry in Canada as elsewhere, and yet with the established competitive philosophy of our subsidy programs, Spar is also expected to compete domestically to sustain this support.

All this leads us back to the fundamental question of how the federal government should attempt to assist and control these multinationals. Should vertical integration as a central commitment be re-examined or is it essentially a beneficial policy for Canada? Can a "chosen instrument" approach be sustained for a multinational like Spar when the support comes through a competitive system of subsidies that are always particularly open to political influence or is a more sustained and consistent basis of support a necessity? Finally with respect to these multinationals, is it sufficient to base continued federal support on the presumption that the headquarters will remain in Canada along with a disproportionate share of the R & D activity?

SITUATION 7: Non-Tariff Barriers as a Constraint on Canadian Firms Operating in World Markets

Over the last two decades there has been a prolonged effort through the General Agreement on Tariffs and Trade (GATT) to open up trading relations among countries through the elimination of barriers. [Quinn and Slayton, 1982; Canada, Department of External Affairs, 1985] Considerable success has been achieved in the area of tariffs but the effort has been much less fruitful in the elimination of other restraints, the so-called non-tariff barriers (NTBs). These barriers take many shapes and forms but

they all involve measures designed to influence the marketplace and encourage the purchase of domestic goods and services. They include government purchasing policies that give a price advantage to domestic products or require a certain percentage of domestic content in the product, equipment standards that will determine whether equipment can be used "as is" or will need substantial re-engineering, "national security" arrangements that exclude foreigners from access to certain technologies or tendering procedures which limit foreign competition, and anti-dumping and countervailing duty measures to guard against "unfair competition". The problem is further complicated by the fact that firms may not always be aware when these barriers have been invoked. While exporters in all countries are effected by NTBs, Canada is particularly heavily exposed because we export about 30% of our production with most of those exports going to one market, the United States. There has been growing support for protectionist non-tariff barriers in the United States in recent years in the wake of a strong American dollar and declining competitiveness against offshore producers and Canada is concerned about the potential consequences such measures might have for Canadian producers.

A large part of Canada's sizeable foreign trade, indeed over 75% of it, is with the United States. As a result Canadian exporters are especially vulnerable to developments in trade politics in that country. In recent years a great deal has been written about growing NTBs in the United States but it is not always clear how serious the problem really is. [European Community Information Service, 1985; Lazer, 1981] Our interviews with government officials, especially those in External Affairs, suggest that these barriers are quite serious in areas touched by national security. On the other hand, interviews with corporate representatives in the private sector tended to discount, although not dismiss, the problem.

Northern Telecom for one has pursued an approach whereby it seeks to clearly establish and demonstrate its corporate U.S. citizenship, not only for purposes of sales within the U.S. itself but also, at least in the case of Japan, in some foreign markets as well. A second firm, Canadian Marconi, says it has encountered few obstacles in selling its very successful battlefield radio, the AN/GRC 103, to the U.S. Army attributing much of their success to the Defence Production Sharing Agreement (DPSA) of 1957 and yet there have been political attempts to end its contractual relationship with the Army in the past and it faces considerable competition from American firms as negotiations continue for a new replacement radio. By all accounts there appear to be significant "national security" restrictions at work but, at the same time, the U.S. market remains the most open in the world.

Compared to the United States, the Japanese and British markets are still much more closed to access by Canadian firms and much of the problem relates to substantial NTBs. [Lazer, 1981; Economist, 1985] Both markets are gradually being opened up to telecommunications and inforamtics competition but at the same time their own domestic industries, especially in Japan, are well placed to deny foreign competitors much success. In Japan the general direction of developments has been to transform the country into a fully digitalized information economy by the end of the century so the potential market is enormous. Nippon Telegraph and Telephone (NTT) was privatized in April 1985 and is now the world's largest telephone company. Its present leadership has been taking hesitant steps to open up the equipment supply market to some competition although most of this competition comes from domestic consortia. Thus the traditional suppliers to NTT (i.e. NEC, Hitachi, Fujitsu and Oki) have seen their share

of NTT's equipment purchases fall from around 60% to under 50% since the late 1970's. There have been some purchases of foreign equipment (for example IBM's deal with NTT for a value added network using IBM's equipment and the sale of switching equipment by Northern Telecom) but for the most part the market is opening up to foreign competition only very slowly. In Britain the government sold off 50.2% of British Telecom (BT) in 1984 and a new regulatory agency, the Office of Telecommunications (OFTEL) has been set up to regulate BT. OFTEL seems to be committed to opening up the British telecommunications market to increased service and equipment competition but it is not clear whether it has the necessary powers to control predatory behavior by BT. OFTEL has authorized Mercury Communications (BT's only officially sanctioned long distance competitor) to hook up with the BT network and is talking about the possible need to separate BT's service marketing and equipment organizations but, as yet, the changes have had only a modest impact. In both of these countries competition has begun to be introduced but the steps taken remain hesitant and small when compared to the United States and Canadian firms presently have only modest prospects for any immediate gains.

The PTT's of Europe provide even fewer prospects for Canadian exporters. [Nora and Minc, 1978; Science Council of Canada, 1983; Ostry, 1981] The telecommunications industries are dominated by government-owned telcos that integrate money-losing postal services with telecommunications and the latter is expected to cross-subsidize the former. The PTT's make significant contributions to government general revenue funds and are highly protectionist in their purchasing policies. Differing national standards and preferential treatment for national equipment manufacturers through testing and certification produces market fragmentation and there is virtually no evidence of increased liberalization of the system which

might provide for some measure of competition and market access for foreign firms. In France for instance, there is now only one equipment supplier for the telecommunications system, the Direction Generale des Telecommunications (DGT), following the 1983 merger of the public switching operations of Thomson's and the state-owned Compagnie Generale d'Electricite (CGE). AT & T has been attempting for some years to gain a toehold in the French market but so far with no success. The French system is the most digitalized in Europe and France is the world's leading user of videotext but all of these market opportunities are closed to foreign firms. Thus while the office equipment market is largely unregulated, testing and certification requirements are used to exclude foreigners. In West Germany the market is even more closed. The Bundespost is supervised by an administration council of the post office and shows little interest in opening up its markets to foreign suppliers. Thus while the PBX market is apparently open to foreign competitors, the Budespost only buys from German suppliers. In general the European market remains closed to foreign firms and there is little to suggest that this pattern is likely to change in the foreseeable future.

Opportunities for Canadian exporters in other markets are more difficult to assess. Some Canadian firms have had degrees of success outside North America and Europe with, for instance, Northern having a long established presence in Turkey and in the Caribbean as well as some recent success in Pakistan. However there are a number of common problems that Canadian firms face outside the markets of the developed countries. In the first place many of these countries have significant financial problems that make any significant modernization or re-equipment of its communications system difficult. Secondly, these types of trade decisions

tend to be very political in character involving, as they do, governments as purchasers and with some of the Canadian firms facing competitors that have access to highly subsidized financing and willing to price their product substantially below cost in order to get a beachhead in the installed base of the local market. Thirdly, there are serious problems with standards at both the macro level in that North American standards differ from those followed in the rest of the world and at the micro level in that there are differences in standards on a country by country basis.

It is apparent therefore that outside North America Canadian exporters face significant impediments to expansion, many of which relate to the presence of NTBs, and that even in the United States they are not without their problems. What can the Canadian government do about this issue - that is the basic dilemma to be faced. As the North American market becomes increasingly saturated in certain markets like telecommunications equipment, new growth opportunities will become more important. Are there concessions that Canada can make in order to earn a place in these new markets? Could our national profile be raised by a more politically-oriented approach to these sales? Or, alternatively, do the concessions that may be necessary only result in Canadian consumers cross-subsidizing their foreign counterparts.

SITUATION 8: Free Trade with the United States and Its Implications for Telecommunications in Canada

Just as Canadian firms face non-tariff barriers (NTBs) in other countries, so too do foreign firms face barriers to trade in Canada. [Jenkin, 1983; Quinn and Slayton, 1982; Rotstein, 1984; Buchan, 1982] Most alleged barriers in Canada are seen as either encouraging domestic production to influencing the geographic distribution of economic activities and, in effect, they act like subsidies. Recently renewed

interest in free trade has increased the visibility of these alleged barriers - most of which evolved historically in a context when domestic telecommunications production was normal in most developed countries including the United States - and has resulted in renewed discussion of their importance. As well certain groups in the Canadian economy might benefit from a reduction in these barriers. The problem facing Canadian policy-makers is the need to assess the advisability of making adjustments to these barriers that would open up the Canadian market to more foreign competition.

In the telecommunications sector, the most important restrictions have been tolerance of the existence of vertical integration between a telco and its supplier, the tariff on telecommunications equipment and measures that allow for the review of certain investments made by non-Canadians. The most contentious alleged barrier is that of vertical integration among Northern, BNR and Bell Canada as well as a similar relationship between U.S.-owned AEL Microtel and British Columbia Telephone. The most important dimensions to this vertical integration are the fact of majority or complete ownership of the equipment manufacturer by the telco and the existence of provisions for a preferred supplier that currently exists between Northern and Bell Canada. The Bell-Northern and AEL Microtel-B.C. Tel ties close off about 70% of the Canadian equipment market to open competition. A second domestic barrier is that of the 17 1/2 % tariff on telecommunications equipment. The tariff has been a particularly influential factor in shaping the interconnect market but, of course, it has broader implications for all ranges of equipment as well. The third barrier is that posed by Investment Canada (formerly the Foreign Investment Review Agency) which has the responsiblity of reviewing and evaluating

certain acquisitions by foreign-owned corportaions in Canada. The recent change in name also involved a change in mandate as Investment Canada now evaluates takeovers in terms of "net" rather than "significant" benefit to Canada, a move generally seen to encourage foreign investment in Canada. At the same time in telecommunications particularly even FIRA did not act as an impediment to investment by foreign firms.

The proponents of free trade with the United States, whether Canadian or American, see many economic benefits flowing from a liberalized trading regime in telecommunications and informatics. [Harris and Cox, 1983] Most firms in these sectors of the economy are active in both the U.S. and Canadian markets and hope that free trade will make their internal operations more orderly, smooth and streamlined and in the case of Canadian firms it will also make it less necessary to establish their credentials as U.S. corporate citizens. American-based firms are interested in the prospect of building market share in Canada, much like Canadian firms such as Northern and Mitel have been able to do in the United States, something that, to date, has been largely beyond their grasp. Even more important is the concern of the U.S. government to establish a regime of free trade in services as a signpost for the next set of GATT negotiations. Many domestic users and subsidiaries of U.S. multinationals also see free trade and the increased competition it would engender as an opportunity to establish a clearly defined state of cost-based pricing in all goods and services. None of these arguments take seriously largely non-economic issues such as the impact on national sovereignty because it is assumed not to be at risk. The theoretical underpinnings derive from the theory of comparative advantage and as telecommunications has been an area of Canadian economic strength free trade presumably would benefit us even further in that sector while it already largely exists in the informatics

sector.

Is free trade really in Canada's interests? If Canadian companies in the telecommunications and informatics markets already face relatively few obstacles to growth in the U.S., how will free trade benefit them? Do the costs of free trade compare favourably or unfavourably with its benefits and whose interests are the proponents of free trade really advocating? Is it reasonable to expect that the American government will waive their national security restrictions, their most important barrier in these sectors, given the highly political character of the defence industry and its purchasing practices? When one considers the Canadian experience in the computer industry where trade barriers have been at a minimum for some time, one has to have second thoughts about the implications for telecommunications and other sectors.

SITUATION #9: The Privatization of Teleglobe Canada and (Possibly) Telesat Canada

Governments have always played an important role in telecommunications. However, in recent years, there has been increased interest in the privatization of these government-owned companies, as a result of the growth in competition in telecommunications and of suspicions about the desirability of governmental involvement in the economy. [Ohashi and Roth, 1980; Pine, 1985; Economist, 1985] At times this interest in privatization has approached that of a fundamental commitment where goals and ends were easily confused. Two federally-incorporated companies have been the centre of such consideration - Teleglobe Canada and Telesat Canada. Teleglobe Canada was established in the nineteen-forties as part of an effort to Canadianize our international telecommunications links which, until that time, had been provided by what later became British

Telecom. Telesat Canada was established in 1969 to create a domestic satellite system and was the first domestic geostationary satellite company in the world. The debate over the privatization of these two companies raises several general issues in the telecommunications sector - first, what benefits will privatization bring to Canada, second, can earlier justifications for some degree of federal ownership be set aside as no longer relevant, and third, can the same goals be met through the use of other policy instruments such as regulation or complete privatization.

The idea of privatizing one or both of Teleglobe and the federal governments interest in Telesat Canada has been around for some time although only Teleglobe has become the explicit object of privatization. Telesat is a mixed corporation, combining public and private ownership, and faces a particularly uncertain future. Its private sector owners - the telephone companies - are largely unwilling partners who see Telesat as a continuing source of deficits. There is some question concerning the commerical viability of an independent Telesat Canada as well as who might want to purchase it. Moreover, many believe that the telecommunications role of satellite technology itself is being eroded and threatened even more seriously in future by the enormous capacity and superior message quality of optical fibre transmission. Teleglobe, on the other hand, is a fully-owned crown corporation which receives most of its revenue from its carrier business and has been described as a "cash cow" because it has been so profitable. As an object of privatization, ownership of Teleglobe has been sought by both the carriers themselves and by other corporations like CNCP, and British Telecom, among others. However, like Telesat, the future of Teleglobe is cloudy. If Teleglobe were to be privatized it would have to be placed squarely in a regulated environment for at least two reasons: if the carriers (whether through Telecom Canada or with Bell Canada acting

on its own) were to control it, the result would be a private sector monopoly begging regulation; and if the carriers were not to own it themselves, it would be necessary to rely on regulation to prevent from bypassing Teleglobe by means of the United States network.

The debate over privatization raises many policy questions. Will privatization bring some real advantages to the Canadian telecommunications industry or is it more an end in itself? Can the goals of "Canadian sourcing" be met if Telesat and Teleglobe are privatized? Alternatively should such efforts to regulate equipment purchases be abandoned because they involve subsidies to uncompetitive components of the communications system? Should the carriers be allowed to purchase Teleglobe and what implications would this involve for the organization and regulation of the telcos? What role will satellite communications play in the Canadian telecommunications distribution system - a complement or competitor to earth-based services - and, therefore, what should happen to Telesat? Finally what will be the impact of free trade in telecommunications services - so assiduously sought by the United States - on Telesat and Teleglobe?

SITUATION 10: The Industrial Impact of New Technology: The Case of Fibre Optics

Fibre optics is one specific example of what the Science Council of Canada calls a "transformative technology", i.e. one which represents a quantum leap in technological and human capabilities. [Science Council, 1971; Science Council, 1981] Originally invented in the early 1970's but only now becoming extensively used, fibre optics - whether used for local distribution or for long-haul transmission - allows for the movement of much greater amounts of information, more speedily and economically, and

with less distortion than either copper wire or coaxial cable. More a pipeline than a wire or a cable, it is virtually a technological prerequisite, along with the shift from analogue to digital modes of transmission, for widespread dissemination of the various computer and communications services which are becoming available. Fibre optic networks effectively eliminate the capacity problem inherent in copper wire or coaxial cable and represent a marked technological advance over both of these technologies. Nevertheless, fibre optics is still costly vis-a-vis existing technologies, and it is by no means unchallenged as a transmission mode vis-a-vis other advanced technologies.

Fibre optics is just beginning to be extensively introduced in Canada and the United States. Bell Canada is no longer using copper wire for major new installations except for drop wires in the local plant and has an elaborate plan for the gradual replacement of copper wire on a priority basis beginning with intercity links and high density downtown trunk lines. Sasktel in particular, has made a major commitment to fibre optics and has completed the building of a 3400 kilometre network which links all major centres in the province. Telecom Canada has announced a $300 million fibre optics network to go right across the country while CNCP has indicated its intention to spend $100 million on a fibre optic link between high density markets in Central Canada and the West. [Surtees, 1985] For computer companies like IBM, fibre optics can be utilized to link computers together in local area networks which compete with telco PBX's in the office automation market. [Johnson, 1984] For cable companies like Rogers Telecommunications or Le Groupe Videotron, fibre optics allows them to offer a wider range of non-programming subscriber services and to compete with the telcos for business and institutional customers. [Hutchinson, 1984] For satellite communications providers like Telesat, fibre optic

networks enhance the competitiveness of terrestrial modes of transmission vis-a-vis satellite transmission. [Ross, 1982; Peat Marwick & Associates, 1983; Hardy, 1984] All in all, the fibre optics market worldwide is estimated at about $900 million in 1984, with Canada well ensconced in second spot behind the U.S. and the market itself expected conservatively to grow at least 30% every year through 1990. [Barker, 1985]

The industrial policy implications of this growing movement towards the use of fibre optics in Canada are several and varied. On one level, the substitution of fibre optics for less advanced transmission modes neatly captures the fundamental choice underlying the whole of Canadian industrial policy. Is Canada best advised to back a "high tech" industrial strategy as represented by fibre optics or should it continue to rely upon a strategy growing out of its abundant natural resource endowment? Likewise, the fibre optics situation is also instructive because the major decisions relating to the use of fibre optics will be made primarily by private sector companies concerned primarily about cost-effectiveness and corporate planning. What role can and should government have in promoting specific technologies? And then there are the more immediate industrial policy implications. Could fibre optic transmission emerge as a serious threat to Canada's considerable investment in satellite communications? Will fibre optics allow cable companies to become real competitors with the telcos in the provision of transmission services for computer communications and certain other markets? Given Canada's experience and expertise in the area of fibre optics, what is the export potential for fibre optics made in Canada? And finally, to what extent should and can decisions on the introduction of fibre optics be affected by their very

direct and real impact on a quite unrelated industry such as the copper industry?

CHAPTER THREE: PROFILING THE PLAYERS: THEIR VIEWS ON THE INCREASED COMPETITION/INDUSTRIAL POLICY PROBLEM

The problem of reconciling increased competition to industrial policy in the telecommunications sector affects a wide range of actors. As we have seen in Chapter II, the problem is a wide-ranging and complex one which manifests itself in varied situations and poses a number of different policy considerations. At least three separate categories of "players" who are typically involved in dealing with the problem can be identified: the federal Department of Communications as well as a variety of other federal departments and agencies; industry actors including telecommunications carriers, equipment suppliers, the computer manufacturing and service industry and the various trade associations which represent these interests; and various other interest groups concerned about the problem and its implications. During the fall of 1985 and early 1986, the authors conducted more than 50 interviews with officials and representatives from all the important players.* Our objective was to identify and explore their views, interests and perceptions of the problem of reconciling increased competition to industrial policy in the telecommunications sector. The interviews typically focused on the basic premise of the study, their positions on the IC/IP problem and its importance for federal telecommunications policy, the usefulness of existing government policies and programs and the adequacy of policy instruments, as well as specific treatment of individual situations where they might be involved. This

---

* These interviews were selected and arranged by the authors and conducted on a non-attributable basis. Where publicly-available documentation is available, this has been referred to in the text. Otherwise, all views and opinions expressed represent the authors' judgment and interpretation of the interviews and should not be attributed to particular individuals interviewed.

chapter presents a description and analysis of all the major players involved with the IC/IP problem, detailing their views, interests and perceptions of the problem and highlighting their concerns about how the problem has and is being handled at the federal level.

3.1 The Major Players Within the Federal Government

The Department of Communications. Our various interviews with telecommunications officials within DOC have confirmed a substantial and widespread interest in the trend towards increased competition and its impact on industrial policy within the sector. Over the past five years or so, there has been a subtle shift away from "regulated monopoly" as the compulsory model for the telecommunications sector in Canada towards a thorough-going acceptance of "regulated competition" as the present-day reality and there is even a significant body of opinion within the department favourable to more extensive and purer forms of competition within the industry. In terms of acknowledging the net benefits of increased competition and acting upon this judgment, the corner has now been turned within DOC. The Department's ongoing telecommunications policy review was originally premised upon and organized around the concept of increased competition in Canadian telecommunications but has more recently focused on finding a federal-provincial consensus and recent government announcements about regulatory reform confirm these two orientations. [Privy Council Office, 1986]

Nevertheless, several important questions remain to be answered about the extent to which increased competition will be allowed to go in Canada. First of all, there is the matter of whether Canada should follow the example of the United States in allowing competition in facilities - initially long distance but later even local - or whether competition can

operate adequately in services and equipment only. Secondly, the "bypass" phenomenon in Canada - its extent and seriousness - will also have an important influence on the timing and degree of movement towards increased competition. Thirdly, there is also the question of the attendant effects of increased competition on local service pricing and universal service and it is this factor which is probably the most important one for DOC at the present time. The future of increased competition in telecommunications in Canada, then, will be determined primarily on technological and user grounds rather than in terms of any industrial policy considerations.

With regard to the industrial policy benefits of increased competition, the pattern of expertise and opinion within DOC is mixed. Except in a few instances, there seems to be no overwhelming view that competition - pure and simple - within all important segments of the telecommunications sector is the way to go and substantial concern about its impact on particular segments. However, there is virtually unanimous agreement on two points: first, increased competition in most segments of the telecommunications sector is inevitable; and secondly, in terms of its impact on the national economy, increased competition will significantly lower the costs of doing business in Canada while at the same time promoting a more efficient allocation of resources even among residential consumers. In the case of the local service, there is no credible and comprehensive threat to the local service monopoly over the next few years, even though alternative technologies like cable distribution systems, new services like cellular mobile radio, or new design concepts like "smart" buildings or teleports may nibble away at the edges of that monopoly. With regard to long-distance service, the situation is recognized as being quite different and a number of factors - the potential of "foreign" bypass, the

availability of resale and sharing, persistent user pressure, the "demonstration effect" of the U.S. experience, etc. - all conspire to make interexchange competition in some form highly likely by the end of the 1980's. In more specialized segments of the telecommunications sector, the competitive mode has already been accepted and seems to be working quite well, whether it takes the form of free-style supply competition as in the interconnect business which has sprung up since 1980, the more limited duopolistic competition evident in the cellular market, or the kind of arbitrage operations expected to develop through resale or sharing. And finally, with regard to the informatics and computer area which is essentially unregulated and inherently competitive, the acknowledged convergence of telecommunications and computers combined with the substantially higher growth rates expected during the late 1980's in areas like office automation can only serve to confirm and enhance the trend towards increased competition. Within DOC, there is now - where there may not have been five years ago - a widespread acknowledgment and substantial acceptance of the industrial policy benefits of increased competition in the telecommunications sector.

At the same time, there is also widespread recognition of the dislocation in policy and the transition costs involved in moving towards increased competition. Our interviews have revealed a number of specific concerns within DOC about the impact of increased competition on industrial policy in the telecommunications sector:

* In the wake of any CRTC approval of interexchange service and given technological developments such as the growing use of fibre optics and the availability of satellite facilities, increased competition could lead to <u>duplication and overcapacity</u>, at least in the short run, and this is leading some DOC officials to consider and assess the Department's proper responsibility and capability for planning within a national telecommunications network whose operation rests predominantly in private hands.

* Some DOC officials continue to hold strongly to the view that vertical integration is a highly beneficial part of the industrial structure for Canadian telecommunications but that the costs of sustaining this arrangement are becoming more visible and difficult to rationalize in the context of Northern Telecom's own corporate strategy as a multinational and intense competition among firms in the world telecommunications market.

* Some DOC officials have taken a strong position on "re-regulation" rather than American-style deregulation as the proper course of action in introducing greater competition into Canadian telecommunications. "Re-regulation" implies that, as increased competition comes to be introduced in different forms into selected areas of the telecommunications sector, there will usually be a concomitant need to continue but modify the role of regulation in those areas rather than to do away with it altogether. This "re-regulation" may and probably will in many cases be directed towards industrial policy purposes.

* Cable and satellites as potential competitors within the overall telecommunications system pose quite different problems from an industrial policy standpoint: DOC officials do not view cable communications as an important telecommunications medium in the near future despite protestations to the contrary from the industry and its increasing importance on the broadcasting side; they do, however, regard satellite communication as a vitally important telecommunications medium vis-a-vis terrestrial links but one which is facing increased competition from other technologies.

* DOC efforts to diffuse innovation such as Telidon and the OCS program, its licensing decisions concerning cellular mobile radio and earth station ownership, and its general attitude towards CRTC actions to open up new markets like interconnect, enhanced service and resale and sharing have all been pro-competitive in tone but the industrial policy considerations bearing on these actions have usually been minimal rather than central.

* There is virtually no disposition within DOC towards pursuing a comprehensive and explicit "industrial strategy" for the telecommunications sector in Canada, recognizing both that government does not have the capacity to mount such an endeavour vis-a-vis the private sector and that such an endeavour is out of step with the mood of the 1980's, but there is support within DOC for a more clearly thought-out and complete approach to the IC/IP problem within the government as a whole.

* Officials within DOC are, however, increasingly becoming sensitive to the industrial policy implications of increased competition in the telecommunications sector and this is evident not only in their own actions but in how the Department is attempting to extend its influence into related policy areas such as trade policy, science policy, tax policy and industrial support policy which impact upon telecommunications policy and practice.

In all of these ways, DOC is showing considerable awareness of and

sensitivity to the IC/IP problem.

At a more general level, the difficulties faced by DOC in dealing with the IC/IP problem stem in large part from shortcomings in the capacity to effectively integrate an industrial policy perspective within the Department. Many of the essential functions performed by DOC which bear upon the telecommunications field - spectrum allocation, space activities, equipment standards, its review functions with regard to CRTC decisions, among others - are essentially regulatory in nature and regulation provides only a very narrow - even though highly important - perspective on industrial policy. Likewise, the Department is itself a significant R & D performer, primarily through the activities of its Communications Research Centre, and this makes it a participant as well as a moderator in this important facet of industrial policy. In addition, DOC does maintain a modest industrial structure group with its Technology and Industry Sector but their activities are largely devoted to monitoring and data collection activities rather than direct involvement in industrial policy-making itself. Moreover, when telecommunications policy and practice is being developed either within the Telecommunications Policy Branch or at higher levels within the Department or at Cabinet level, industrial policy considerations must always be balanced off against broader economic, social or political considerations. And in this last regard, not the least important of these political considerations are federal-provincial relations where provincial governments are often wary of and sometimes opposed to federal involvement in areas of industrial policy which they covet for themselves as well as Canada's international relations where it is difficult to mount national policies in the industrial sphere because of the constraints of operating within international agreements like GATT.

Thus, DOC's command of industrial policy instruments in the telecommunications field is quite incomplete and many of the key instruments - tax incentives, subsidy programs, ownership and control - rest in the hands of other government departments or in the private sector, although DOC can certainly influence the use of these instruments by other federal departments and agencies. On a variety of different levels, then, DOC's involvement in the industrial policy aspects of Canadian telecommunications has not been a primary policy objective.

Brief mention should also be made of the views, interests and perceptions of the IC/IP problem on the part of federal agencies associated with DOC - i.e. CRTC, Teleglobe Canada, and Telesat Canada. The CRTC, as the quasi-independent regulatory agency responsible for telecommunications regulation within federal jurisdiction, has played a most important role in promoting increased competition in the Canadian context. Through a series of decisions on system interconnection, terminal attachment, the Bell Canada reorganization, Telesat Canada pricing policies, enhanced services and even in the recent interexchange decision, the CRTC has consistently accepted the validity of increased competition within Canadian telecommunications and set down many of the rules whereby competitive market activity operates in this field. In making its decisions, however, the CRTC has had no formal mandate to look at the industrial policy implications of its decisions, although there is considerable evidence to suggest that it has often been aware of them in the past. The Commission has expressed a view that perhaps it should be empowered or directed to pay more specific attention to such matters and to take them into account directly in its decisions or, alternatively, DOC should be responsible for giving it clear "policy direction" in this regard. [CRTC, 1984] Teleglobe Canada, as a wholly-owned crown corporation with a monopoly for the

provision of overseas telecommunications by cable or satellite at the time when this report is being written, has likewise been a potential focus for industrial policy concerns. The company, however, has not perceived itself to be bound **directly** by any industrial policy considerations in its equipment procurement or its dealings with other telecommunications carriers, although it does in practice give preference to Canadian suppliers where possible. If it is to be privatized in some form as the federal government has indicated and probably subjected at the same time to regulatory supervision, there is little expectation that either its monopoly role or its effective exemption from an explicit industrial policy mandate would change. [Teleglobe Canada, 1985] Finally, Telesat Canada finds itself in quite a different situation. In its founding statute and through practices followed over the years, this public/private sector "mixed enterprise" venture has followed a Canadian "sourcing" requirement over and above competitive bidding practices and this has led to close and continuing relations with particular suppliers like Spar Aerospace. This explicit link to industrial policy considerations is viewed as having been effective in building a domestic satellite communications capability, although not without some cost in terms of lowest-cost supply of satellite equipment and possible overinvestment in facilities on the part of competitive carriers. This latter point becomes particularly important in the context of the growing potential competition between satellite and fibre optic modes of long-haul transmission and the longstanding desire on the part of government to continue to encourage use of satellite communications in Canada and to sustain the unique public sector / private sector partnership which has until now underlain Canada's overall capability in this area. [Telesat Canada, 1984] Because of their

association with DOC, each of these bodies, then, is also drawn - directly or indirectly - into the debate over reconciling increased competition to industrial policy in the telecommunications sector.

The Department of Regional Industrial Expansion. DRIE, reconstituted along its present lines as a result of its new designation, has an obvious interest in the industrial policy and regional development aspects of telecommunications. Within the Department, telecommunications is treated both from a sectoral perspective and in terms of broader economic management concerns. The Electronics and Aerospace Branch subsumes telecommunications as a relatively minor sector within its purview and, at headquarters in Ottawa as well as through regional offices, is primarily responsible within DRIE for both the industrial support and regional development programs available to the sub-sector. In addition, DRIE also maintains an Office of Regional Development which coordinates federal-provincial agreements and sub-agreements known as ERDAs, it advises government across the wide range of industrial policy concerns from privatization and regulatory reform to specific sectoral problems, and its Minister is responsible to Cabinet and Parliament for decisions on the encouragement and review of foreign investment initiatives through the recently-reconstituted Investment Canada. [DRIE, 1985] With regard to telecommunications and specifically its industrial policy aspects, DRIE is potentially both a complement and a competitor to DOC and there is evidence of both patterns in their relationship. As a general rule, DRIE has tended to complement DOC in its emphasis on the need to provide government assistance through a variety of industry support programs for small- and medium-size firms in the telecommunications and informatics area who wish to conduct R & D and develop new products and markets. On occasion, however, it has come into conflict with DOC - and will likely continue to

do so in future - where one department seeks to carry out explicit industrial policy initiatives on its own behalf and without appropriate consultation and coordination with the other.

DRIE's orientation towards industrial policy has been changing since the early 1980's. Prior to the reorganization, the former Department of Industry, Trade and Commerce was somewhat half-heartedly engaged in developing an "industrial strategy" emphasizing the varying contexts and requirements of individual industry sectors but this approach became bogged down as a result of conflict over differing philosophies and interests among central agencies at the federal level including Finance and PCO, varied patterns of support and opposition among provincial governments, and a notable lack of enthusiasm from the private sector including both business and labour. At the more operational level, ITC and a few other agencies originated an "alphabet soup" of industrial support programs - IRDIA, PAIT, STEP, DIPP, IRAP, PILP, and the list could go on - whereby government undertook to support industry projects of varying purposes and largely on a competitive, project-by-project basis. For its part, the former Department of Regional Economic Expansion sought to fashion a regional development strategy which emphasized infrastructure development more than actual industrial projects, where provincial governments objected strenuously to federal intervention in their areas of responsibility and where private sector interests were not effectively engaged in the process. Through its General Development Agreements after 1973, DREE sought to respond to some of these concerns but the result was a program lacking in clear focus with a substantial degree of flexibility. The 1982 reorganization which brought together the industry components of DREE and combined them both in DRIE represented an important evolution in

organization but not always a fundamental change in philosophy or programs. [Office of the Prime Minister, 1982] Change at the philosophical level within the new DRIE, however, started to become evident only after the reorganization and especially with the change in government in 1984, but it is still not clear how much change at the program level has yet occurred or will in future take place. Nevertheless, since 1984, DRIE's general orientation has gradually been changing - more emphasis on "framework" policies and less on sectoral strategies, more pro-competitive in tone, less confident of the utility of industry assistance but not of regional development programs per se, greater support for tax incentives vis-a-vis subsidy programs, more emphasis on turning over the delivery of programs to the provincial government, new themes such as privatization and regulatory reform, etc.

DRIE's sector officials, both at headquarters and in the main regional offices, recognize the increasingly competitive nature of Canadian telecommunications but also continue to see the validity of pursuing industrial policy initiatives in certain instances. They point to a number of cases where government assistance has significantly benefited individual firms - Mitel, Microtel, and other less prominent firms in the telecommunications and informatics area - and justify industrial support programs in terms of the small- and medium-sized companies which have been assisted to emerge and the continuing R & D and employment created as a partial result of these programs. As well, they are also aware that large companies like Northern Telecom have chosen to make no use of such programs since the 1970's because of their ability to generate funds to support worthy projects internally or through public share offerings while some firms like Geac Computer have either had poor experiences with government grants or others like Gandalf have made a conscious decision to forego such

support. Industrial support is now channeled primarily through the Industrial and Regional Development Program (IRDP) where telecommunications and informatics projects represent perhaps 5% of total assistance of nearly $500 million in 1984-85 as well as through the Defence Industry Productivity Program (DIPP) where an estimated 10-20% of its 1984-85 budget of $130 million is devoted to telecommunications and informatics projects. Companies which have received support under these and other DRIE programs are usually small- and medium-sized firms, Canadian-controlled companies, and manufacturing rather than service or retail operations. DRIE officials emphasize that support is provided only for innovative projects which promise commercial viability and should not be awarded in such a way as to distort competitive activity among domestic firms. They reject any charge that they are engaged in "picking winners" through their program activites and point to the close relations which they often have with DOC officials when matters of industrial support are decided. In sum, there is presently no attempt within DRIE to key specifically to the telecommunications and informatics sector in Canada as a special focus for industrial policy and little disposition to do so in future.

The Office for Regional Development within DRIE performs essentially a staff function in promoting and coordinating the regional development aspects of the Department's overall mandate. Since 1983, the federal government has begun to negotiate Economic and Regional Development Agreements with each of the provinces as part of a revamped regional economic development strategy. [Governments of Canada and the Provinces, 1985] These agreements provide an "umbrella" for federal involvement in industrial and other development within the province, based upon the provincial government's own priorities, and are put into effect through

individual sub-agreements dealing with particular projects on a cost-shared basis. Umbrella agreements have now been signed with all ten provincial governments and some 80 sub-agreements have also been entered into. Both the Canada-Manitoba and the Canada-Quebec agreements have contained provision for communications industry initiatives which have subsequently been followed up with specific sub-agreements. DRIE officials point out that such agreements represent a good way for DOC to undertake specific projects in cooperation with provincial governments and departments like DOC and to fund them from outside departmental funds. DRIE officials are also most interested in tying communications more closely to regional development through further sub-agreements but this obviously depends on provincial government priorities. These initiatives, however, must be justified in regional development terms rather than on industrial policy grounds per se and there has been little or no thought given to the relationship between increased competition within the telecommunications sector and the logic of this assistance.

The Minister of Regional Industrial Expansion is also responsible for the activities of Investment Canada in promoting and reviewing foreign investment initiatives. Under the recent legislation establishing Investment Canada as well as under the prior Foreign Investment Review Act, however, the final decision on all takeover or new business proposals is made specifically by the Minister (and Cabinet if appropriate) and not by Investment Canada itself which acts primarily in an advisory capacity in assessing proposals according to the criteria set down in the Act. The recent legislation did increase the financial thresholds beyond which proposals will in future be subject to review by Investment Canada and also changed the overall test from one of "significant benefit to Canada" to the less onerous one of "net benefit to Canada". [Investment Canada, 1985]

Investment Canada officials, however, tend to play down any discontinuities with the previous legislation and regard the new emphasis on promotion rather than regulation of foreign investment as a shift in tone rather than substance. With regard to the telecommunications and informatics area, they point out that three of the criteria of assessment refer specifically to "the effect of the investment on competition within an industry or industries on Canada", "the compatibility of the investment with national industrial, economic and cultural policies", and "the contribution of the investment to Canada's ability to compete in world markets". As well, they note that broadcasting, publishing and film have been singled out as sectors of "national heritage and cultural development" where stricter ownership policies have been adopted and, theoretically at least, there is no reason why telecommunications could not be added to that list. In practical terms, however, the trend has been in quite a different direction with regard to telecommunications and informatics proposals. In the relatively few cases which have arisen over the years with regard to such proposals, Investment Canada and its predecessor agency have routinely and without exception advised in favour of takeover or new business proposals such as AT & T Communications' move in Canada, Philips Cables divestment as a result of an offshore merger, and British Telecom's recent takeover of the interconnect firm CTG. With regard to a major takeover such as the sale of Mitel to British Telecom, however, Investment Canada officials indicated that such a proposal would be looked at in more depth with particular attention to maintaining control over domestically-generated technology, the "corporate positioning strategy" involved, and whether or not a Canadian alternative was possible. Clearly, Investment Canada could be a forum for the consideration of industrial policy considerations but

one which would adopt this role only reluctantly and under explicit policy direction.

Finally, DRIE has in recent years been developing its "strategic planning" capability so as to be able to influence industrial policy not only on a sectoral level but also horizontally in terms of appropriate "framework policies". In this regard, DRIE has been taking on some of the characteristics of a "central agency" while holding firmly to the "hands off" philosophy being articulated at the metapolicy level by the government as a whole. "Framework policies" are favoured in that they set out the basic "rules of the game" while allowing private sector participants greater flexibility and certainty in responding to business opportunities. Strategic planning officials point to the need for DRIE to articulate clear policy positions on a wide range of issues from competition to fiscal instruments to privatization or regulatory reform and to work with like-minded departments in pressing these positions. With regard to competition, they point to the pressure from business users for CNCP's proposal for duopolistic competition in long-distance service as a way of reducing costs and strongly support this and other ways of further breaking down the traditional monopoly structure of Canadian telecommunications. On the tax incentives versus subsidy programs issue, they argue for greater reliance on tax incentives in direct opposition to the "sectoral" elements within their own department. Concerning regulatory reform, they favour efforts both at procedural and substantive reform to reduce the burden of regulation on business and society. And finally, with regard to privatization, DRIE along with Treasury Board have taken the leading role in fashioning governmental policy and practice. Teleglobe Canada has been designated as one of the first four crown corporations which are to be privatized and the Canada Development Investment Corporation - a DRIE agent

- is presently establishing guidelines and evaluating bids for Teleglobe while also in the process of having a major indirect influence on the formulation of a key aspect of telecommunications policy. Within DRIE and in its relations with DOC, then, there is evidence both of complementary and competitive behaviour with regard to how increased competition is being reconciled to industrial policy in the telecommunications sector.

The Department of External Affairs. Like DRIE, External Affairs emerged from the 1982 government reorganization as quite a different department and one which became to a significant extent involved in domestic policies and programs as well as the conduct of Canada's foreign policy. [Office of the Prime Minister, 1982] In addition to its traditional diplomatic functions, External Affairs added the trade section from ITC and took on more explicit responsibility for coordinating the broad range of international activities including CIDA, the Export Development Corporation and other activities. Prior to the reorganization, External Affairs did not really play a role with regard to telecommunications and informatics except insofar as they became matters for discussion and sometimes for negotiation in international organizations like the ITU, OECD, or other such bodies. On these matters, an implicit division of labour evolved between External Affairs and DOC which allowed both to participate in the area of international telecommunications. As well, External Affairs was of course primarily responsible for Canada's relations with other nations - and of particular importance with the United States - and telecommunications and informatics issues arose reasonably frequently within this context. Transborder data flows, assisting Canadian businessmen in making contacts abroad, monitoring telecommunications policy in foreign countries, promotional programs, etc. are all activities which

External Affairs continues to be involved with on a routine basis. The shift of all major trade functions to External Affairs substantially increased its involvement with telecommunications and informatics. Not only does the Department continue to be involved with trade development and promotion activities both at headquarters and in the field but it has also taken on special responsibility for marketing Canadian high technology abroad and, furthermore, is centrally involved in current bilateral and multilateral trade negotiations where telecommunications and informatics are important issues.

The main thrust of External Affairs' role in the telecommunications and informatics area has come to focus on trade policy and specifically how Canada's exports to other countries can best be enhanced. A common sentiment expressed in our interviews with External Affairs officials was that there are significant business opportunities to be exploited in U.S. markets as well as, with greater uncertainties, in the markets of Great Britain and Japan which are both currently liberalizing their telecommunications policies. Canada's reliance on Northern Telecom as a world-scale and comprehensive supplier of telecommunications equipment combined with successful "niche" strategies on the part of several medium and smaller firms provides the best overall strategy. However, Canada's ability to export successfully into these markets is currently being threatened on several accounts and these problems must be dealt with. Among these rising barriers to telecommunications trade are such matters as protectionist legislation pending in the U.S. Congress, significant non-tariff barriers to entry into the U.S. and other markets, the pace and extent of liberalization in Britain and Japan, the ability of Canadian firms to compete effectively in other foreign markets, and the status of ongoing multilateral and bilateral trade negotiations. The view from

External Affairs seems to be that telecommunications in particular is something of a model for Canada in terms of efficient operation and effective industrial policy and that this model should not be jeopardized by too much domestic competition which might inhibit its ability to act effectively on the international scene. Thus, competitiveness on the international scene would be viewed as the first priority for External Affairs in reconciling increased competition to industrial policy in the telecommunications sector.

Officials responsible for telecommunications as a trade issue within External Affairs regard the basic problem as one of "market access" rather than the consequence of tariff or non-tariff barriers or weaknesses in export marketing. They make sharp distinctions between the long-standing PTT-countries, liberalizing PTT-nations, the developing nations and the U.S. market. No lowering of tariffs or elimination of non-tariff barriers nor any expansion of export marketing capabilities among Canadian firms is likely to break down the monopoly supply structure of telecommunications in countries like France or West Germany where governments are determined to maintain and protect a national industrial capability. Only thorough-going domestic deregulation would open up these markets and this is unlikely. In liberalizing PTT-nations like Great Britain and to a lesser extent, Japan, however, prospects are somewhat better as Canadian and other foreign firms are beginning to compete for market access and it will be solid but aggressive companies as well as those which can manipulate tariff and non-tariff barriers like Northern Telecom and perhaps Mitel which will be best positioned to move into those markets. As to the developing nations, Canadian multinationals are viewed as having excellent prospects in competing for telecommunications projects in these nations, although

financing and cutthroat competition remains an important problem. With regard to the United States, the 17.5% Canadian tariff on telecommunications equipment as compared with the 4% U.S. tariff and in combination with present currency values for the Canadian dollar create a generally favourable condition for export trade which is only partially negated by American non-tariff barriers such as "Buy America" provisions and "national security" limitations as well as protectionist sentiment within Congress. The U.S. market is likely to remain Canada's largest market for telecommunications trade for some years to come and one which is remarkably open even without any movement towards free trade. In fact, Canada's interests in the telecommunications field and those of the United States are largely parallel and in conflict with the rest of the world. Such an analysis would suggest that Canada should facilitate the activities of its major telecommunications multinationals while encouraging other Canadian companies in this area and in informtics to attain the size required to allow them to follow the same path. As well, it suggests that bilateral free trade with the United States in the telecommunications area may not be so crucial as a general lowering of tariff and non-tariff barriers at the multinational level. Increased competition within the Canadian context should be allowed to go only so far as to encourage and reinforce similar trends in major foreign markets while industrial policy in Canada should be directed towards building a technologically-advanced and export-oriented telecommunications manufacturing capability.

With regard to the "information business" more broadly, Canada's strengths in telecommunications trade are offset somewhat by weaknesses in the computer and informatics areas. External Affairs officials point out that there are over 1800 companies operating in the telecommunications, computer and informatics area. Canada's computer industry is largely

foreign-owned and controlled and this places severe limitations on government's ability to prosecute a clear trade policy in this area. Where Canadian firms do exist, they usually try to exploit "niche" strategies where they supply particular products or components rather than whole systems and this requires a much more specialized approach to trade promotion. Moreover, with regard to informatics, the nature of the industry is such that firms are footloose and it is difficult for government to harness successful firms to any clear-cut trade policy. It is also worthy of note that External Affairs has also become directly involved in marketing Telidon technology on the international scene and this adds yet another dimension to the trade promotion function. As a general rule, then, it is very difficult, if not impossible to orchestrate an effective trade policy with regard to the "information business" broadly and governments are probably ill-advised even to try to do so. Government should, however, attempt to maintain an integrated approach to the area and External Affairs officials contend that trade should be conceptualized not in terms of equipment or services alone but rather in terms of "networks" and marketed accordingly. External Affairs officials also suggest that government can assist Canadian telecommunications, computer and informatics companies best through trade promotion and market identification activities both at headquarters and through Canada's system of trade representatives throughout the world. External Affairs officials feel, however, that Canadian firms could be much more aggressive in exploiting export opportunities, although they recognize that this is in many instances a consequence of the "truncated" nature of those firms. Nevertheless, it is clear that External Affairs officials continue to believe that trade development and promotion activities should be regarded as a central

feature of industrial policy with regard to the "information business".

Bilateral trade negotiations with the United States, or what is called "free trade" in popular parlance though not at External Affairs, has obviously become central to any discussion of the future of the telecommunications sector and the reconciliation of increased competition to industrial policy. Not only is this a crucial issue for External Affairs but also for virtually all the other federal departments and agencies examined as well as for most industry and public interest groups. External Affairs views the present bilateral trade negotiations with the United States as flowing-out of previous successful though limited agreements like the 20 year old Auto Pact as well as more recent failures such as the sectoral free trade negotiations of 1983-84 which never really got rolling. The 1985 Canadian government initiative which has subsequently been taken up by the U.S. government is designed to be more comprehensive and open-ended than have any bilateral trade negotiations in the past with everything potentially on the table for discussions and with no significant exemptions or preconditions to inhibit negotiations. [DEA, 1985] In this spirit, External Affairs officials claim not to have formulated any set position on a possible free trade deal and have been coordinating a government-wide analyses of its implications while also preparing for consultation with private sector and provincial government interests. Telecommunications and informatics are receiving considerable attention as likely subjects for discussion and negotiation but External Affairs officials are unwilling to say where this sector and its circumstances will fit within Canada's overall strategy. Some officials, especially those generally involved with Canadian-American relations, seem more favourably inclined towards making telecommunications and informatics an important part of any free trade deal while others more directly

involved with the industry are not so sure that the present situation is not more advantageous. It is clear, however, that any free trade pact which included telecommunications and informatics would carry with it the potential for much greater competition in the Canadian marketplace and would seriously inhibit government's ability to pursue industrial policy goals and instruments. Obviously, the continuing bilateral trade negotiations with the United States bear close scrutiny and analysis, especially as the executive and legislative branches of government become directly involved in the U.S. and provincial governments and the private sector assert themselves in Canada.

At the same time that Canada is beginning bilateral trade negotiations with the United States, it will also be engaged in important multilateral discussions and negotiations on the international level which also bear directly on the telecommunications and informatics area. The most important of these multilateral negotiations will take place in the GATT negotiations to begin shortly in Geneva but it should not be forgotten that ongoing discussions through the ITU, OECD, and other forums can also affect Canada's interests. Those preparing Canada's position for the GATT negotiations expect that telecommunications and informatics will arise in several contexts. With regard to procurement practices, there will be attempts to extend the present code so as to open the procurement practices of European and other PTT's to greater foreign competition and, on this issue, Canada and the United States are likely to find themselves on the same side. With regard to tariff and non-tariff barriers, Canada continues to be committed as a result of the 1979 negotiations to at least a 40% reduction in its telecommunications tariff - if and when European nations indicate their intention to change procurement practices - while Canada

along with its most important trading partners - the United States and Japan - presently impose no significant tariffs on computer products crossing their borders. For External Affairs officials involved with the GATT negotiations, however, it is the growing array of non-tariff barriers which are most worrisome in the telecommunications and informatics area and, in the final analysis, it is not at all clear how serious all the major countries - including Canada - will be in agreeing to take action to reduce those barriers. The most important issue presently emerging in the GATT negotiations is undoubtedly the "trade in services" issue. The U.S. government has indicated its intention to press for a strong "trade in services" code which would provide for free flow of information of all types among signatory nations and this proposal, if accepted, could dramatically increase competition in Canadian telecommunications and informatics markets while also inhibiting government action on industrial policy. It is unlikely that Canada could accept the U.S. position as it now stands, whether in a multilateral or bilateral context, and the final outcome of negotiations on this point is viewed by External Affairs as crucial not only for the telecommunications and informatics area but also for the future of the GATT negotiations themselves. In terms of Canada's role in other international bodies, many of the same issues arise as mentioned above but there are also other issues - equipment and service standards within ITU, transborder data flows within OECD, etc. - which likewise affect the IC/IP problem but it is clearly the GATT negotiations which External Affairs regards as most important at the present time.

Finally, brief mention should also be made of the way in which External Affairs has evolved as a program delivery department which administers or coordinates export development and financing programs available to Canadian industry in the telecommunications and informatics

area. Between 1982 and 1984, its Program for Export Market Development (PEMD) provided some $6 million out of a total budget of $90 million for communications-related projects while additional support was forthcoming through analogous technical assistance and promotional projects programs. In particular, export financing has been identified by External Affairs officials as well as through industry interviews as a major problem in facilitating trade in the telecommunications and informatics area. During 1982-83, the Canadian Commercial Corporation which contracts with foreign governments and international agencies on behalf of Canadian suppliers awarded $194 million in contracts in the telecommunications and informatics area which constituted roughly 1/3 of its total contracts. As well, the Export Development Corporation which provides financial services to Canadian exporters and foreign buyers extended a total of $245 million financing for telecommunications and electronic equipment exports in 1982-83 representing about 25% of its total financing. In these ways, External Affairs has begun to play a more active role in export development and financing with the telecommunications and informatics sector benefiting specifically from this development.

The Ministry of State for Science and Technology. MOSST is the fourth major federal government department with a vital interest in the IC/IP problem and stands at the centre of the governmental science establishment. Its role dates back to the 1960's when the federal government became concerned about the quality of scientific advice and public knowledge of science and technology and, since 1971, the Ministry has been the major internal advisor on R & D and related policy issues as well as an important player on industrial policy concerns. [MOSST, 1985] However, MOSST is by no means alone in giving advice on science and technology in that both the

Science Council of Canada, the National Research Council, and many line departments and agencies are likewise involved. The Science Council's role since the late 1960's has been to be the public advisor to government on science and technology and, in this role, it has sought to push, prod and sometimes provoke government into action on important social and industrial issues. The National Research Council is the largest and most prestigious source of in-house basic R & D and increasingly has become involved with industry, universities and others in applied science and technology. In addition, individual federal departments and agencies like DOC itself often maintain a substantial R & D component such as is evident in the work of the Communications Research Centre. In recent years, the federal government's science establishment has been hit severely by financial restraints at the same time that science and technology issues have never been more important to the country. This has meant that MOSST has had to search even more earnestly for ways and means of encouraging greater private sector R & D and diffusing the results of public and private sector research throughout the economy. For MOSST, telecommunications and informatics are a major area of interest and a key element in science and technology policy.

MOSST officials emphasize that the Ministry, in keeping with its internal advisory role, normally takes a low-key monitoring and analytical approach to science and technology issues rather than an overt advocacy position. Nevertheless, interviews with Ministry officials reveal that rethinking is underway within MOSST on how R & D can best be promoted in Canada not only in the telecommunications and informatics area but elsewhere as well. Not surprisingly, there is a firmly-held view that science and technology hold the key to economic growth and social improvement and that Canada's R & D performance has not been good enough in

the past either as compared to other major industrial countries or in terms of adequately underpinning the country's economic development. MOSST officials argue that R & D conducted in Canada - whether in the public sector, the private sector or in the universities - must be geared more directly to industrial innovation and its diffusion. In this regard, increased competition is viewed positively as a spur to innovation and there has been a falling away from earlier views that monopoly and concentration breeds innovation. Likewise, MOSST is not - nor has it ever really been - a proponent of the "industrial strategy" position which would see government developing and implementing an overall plan or even a set of sectoral strategies. In an area like telecommunications, such a sectoral strategy would be viewed as imprudent and dangerous. At the present time, MOSST is very much involved in rethinking its views on how R & D can best be encouraged. Despite the withdrawal of the Scientific Research Tax Credit, there is still a strong feeling that tax incentives - well-conceived and with proper safeguards - are a better way than subsidy programs to stimulate R & D. Likewise, the need to harness science and technology in Canada to export trade is also regarded as crucial given the size of Canada's domestic market and the voracious appetite of world-scale R & D activities. There is also increasing interest within MOSST in using government procurement as a mechanism for encouraging R & D, in placing greater reliance on industry and the universities for R & D, and changing the present role of government laboratories. In sum, MOSST seems to be moving more towards a private sector science policy and away from the tradition of government-centred science policy.

The tax credits versus subsidy programs debate is presently drawing much attention within the Ministry. MOSST officials estimate that

government subsidy programs where R & D is a significant objective currently run at about $500 million while tax credits - exclusive of the SRTC - are stabilizing at about $300 million annually. MOSST itself runs no subsidy programs but attempts to influence the use of those run by a wide variety of departments and agencies including DRIE, Employment and Immigration, NRC, DOC, etc. Tax credit schemes for R & D purposes are of course the responsibility of the Minister of Finance and are put into effect through Revenue Canada but MOSST is an important player in developing and evaluating use of this policy instrument. Within MOSST, the predominant sentiment at the present time is in favour of the tax credits approach, although there is a recognition that subsidy programs can and do have a place in supporting R & D. The main benefits of the tax credit approach is that it leaves industry to make its own R & D decisions without bureaucratic and political involvement, it can be used both by firms which are making money and those which are not, and it provides a broader and more natural impetus to scientific and technological development. Even the SRTC program - which MOSST officials and virtually every other group we interviewed viewed as a regrettable failure - was good in its conception but poorly designed and without the proper safeguards built in and MOSST officials hope that this experience will not deter government from using this approach more effectively in future. At the same time, MOSST officials acknowledge that subsidy programs have a role to play in encouraging R & D especially where "strategic technologies" are involved or where new firms and markets need to be created. Their view is that a new balance on the tax credit versus subsidy program is evolving where there will be greater reliance on the former while maintaining government's ability to use the latter instrument where most appropriate and this particular balance would probably be generally acceptable to the

telecommunications and informatics sectors.

The role of the National Research Council - the government's largest and most prestigious laboratories - as well as other government science facilities is also an active matter of concern within MOSST. The NRC itself has been changing its orientation somewhat in recent years with a greater emphasis on transfering science and technological developments from government laboratories to private industry, collaborating with industry on industrial R & D, and even supporting involvement in marketing activities which go beyond the R & D function. Its Industrial Research Assistance Program (IRAP) channeled $2.5 million out of a total budget of $26 million to communications-related projects in 1984-85, the Program for Industry/Laboratory Projects (PILP) generated approximately $1.6 million out of $20 million during the same period, and NRC has only just recently announced its first program which takes it into the marketing area. MOSST officials recognized that these activities are relatively minor in terms of overall spending but regard them as creative and well-managed initiatives in science and technology. MOSST officials are not always so complementary about some of the efforts of federal departments including DOC in mounting their own innovation projects. Telidon in particular is not viewed very favourably by MOSST as an example of a government-directed innovation project. As a general rule, then, MOSST is moving towards a more private-sector science policy and in which government facilities must be integrated more meaningfully with industry and university efforts.

Finally, the Science Council exists as a separate public advisory body on science and technology issues and has often been a "thorn on the side" of MOSST especially through its advocacy of an "industrial strategy" for Canada. In a series of reports dating back to the early 1970's, the

Science Council has advocated such an "industrial strategy" as the proper governmental response to Canada's weaknesses in secondary manufacturing, its precarious competitive position on the world scene, and its below-average R & D performance. [Science Council, 1984] In particular, it has advocated industrial policy designed to promote "technological sovereignty" and greater emphasis on "high technology" and to use government more actively and overtly to achieve industrial policy goals. Obviously, this position has long been "out of sync" with thinking among MOSST officials as well as that of most other federal departments and agencies and much of Canadian industry. MOSST officials simply feel that, even if it were desirable, government does not really have the capability to direct such a "dirigiste" approach to industrial policy, that there are too many obstacles to such an approach in federal-provincial and public-private sector relations, and that it would not be in Canada's fundamental interest to focus narrowly on indigenous R & D and attempt to cut itself off from world market realities. The Science Council, then, has had little influence on MOSST or on government policy and programs generally, except in helping to define the terms of the debate, and there is little evidence that that relationship is likely to change.

Other Government Departments and Agencies. In studying the IC/IP problem, our interviews have taken us far afield among federal government departments and agencies. The problem itself is a broad and unrestricted one and this has meant that a variety of different departments and agencies have some interest in the problem and often quite useful contributions to make on particular aspects. One of the basic points which has become clear is that reconciling increased competition to industrial policy in the telecommunications sector is not exclusively a matter of telecommunications policy alone or even a matter which can be handled by the four primary

departments already treated but rather the problem also impinges in part upon a variety of other departments and agencies in different policy areas. In this section, we will provide brief profiles of the views, interests and perceptions of many of the relevant departments and agencies where we have conducted interviews. It should be noted that, had we had more time and energy, several additional departments and agencies might also have been included.

The Economic Council of Canada. This body is analogous to the Science Council in its role as a public advisory body but the ECC could not be more different in the position which it takes and the analyses which it has done on competition and industrial policy matters. Whereas the former is the primary exponent of the need for an "industrial strategy" in Canada, the ECC has not taken an explicit counter-position as such but its successive annual reviews and various studies and papers seem almost calculated to challenge the assumptions and arguments upon which that proposition is based. The ECC was an early proponent during the mid-1970's of "free trade" with the United States, it strongly supports the need for procedural and substantive regulatory reform and it has recently become highly critical of government subsidy programs for industrial support and R & D. [Economic Council of Canada, 1984] While the ECC does not generally focus attention on specific sectors like telecommunications, several of the studies which it has published in recent years speak to the IC/IP problem in its various dimensions. One ECC study is highly critical of government-directed innovation projects including Teledon; another questions the rationale for and benefits of present industrial support programs; yet another reviews Canadian industrial development from 1960 to 1980 and concludes that the case for an industrial strategy is "not proven"; and

finally, ongoing reserach on technological change and its implications for employment suggest that "high tech" industries have been above-average in job creation during the 1970's but that their contribution to total employment still remains minor. In these many ways, the ECC continues to make an important contribution to the public debate on industrial policy in Canada and provides a nice balance vis-a-vis the views expressed by its sister advisory council.

Consumer and Corporate Affairs. The Department of Consumer and Corporate Affairs is responsible for ensuring that business conforms to Canada's competition laws and that the public interest of Canadian consumers is protected. Through its Regulated Industries Branch, it monitors developments in the telecommunications industry and evaluates telecommunications policy and regulation in terms of competition policy. [Director of Investigation and Research, 1985] Naturally, CCA officials are in favour of as much competition as possible within an industry such as telecommunications, subject only to the constraints of "natural monopoly", and competitive behaviour which operates in as free and fair a manner as possible. Equally so, some CCA officials are strongly critical of the present industry structure for Canadian telecommunications on a number of grounds. CCA officials have supported long distance competition whether along the lines of the recent CNCP proposal or in other ways because they feel that there is no continuing justification for monopoly and much to be gained from such structural change in terms of efficiency and lower user costs. With regard to vertical integration, some CCA officials continue to oppose this practice as inhibiting industry competition and increasing telecommunications costs and favour competitive bidding procedures if not outright divestiture. They point to the interconnect market as an example of what can happen when competition is opened up and hold out similar hopes

for enhanced services and resale and sharing. With regard to regulatory reform, they support both procedural and substantive deregulation but see little evidence that "progressive change" is presently being made in the telecommunications area. And most importantly, CCA officials do not regard their department and its activities as industrial policy in the normal sense of the term. They claim to take no firm position on the normal industrial policy issues like incentives versus subsidies, foreign control, privatization, etc. and reject attempts to view industry structure in sectoral terms in favour of following "framework" policies such as the recently-introduced competition legislation. In sum, only if competition were to be defined as the preeminent feature of industrial policy would CCA officials be prepared to accept the legitimacy of industrial policy considerations in an area like telecommunications and informatics.

Employment and Immigration. The Department of Employment and Immigration would seem to have an obvious interest in the IC/IP problem from the point of view of job creation within the telecommunications and informatics area. [Employment and Immigration Canada, 1985] Rather surprisingly, however, there does not yet appear to be much in the way of firm evidence or views on competition and its impact on employment or the potential for generating future jobs in the high technology field. E & I officials can summarize the results of studies done by international organizations or in other countries which indicate that large gains in employment should certainly not be expected from ongoing developments in the telecommunications area and the picture is only slightly better in informatics. They further suggest that research does not prove any particular industry structure - monopoly, competition or something between the extremes - is likely to generate maximum employment growth. Like many

of the other departments we visited, E & I officials favour "framework" rather than sectoral policies. They point to the recent Canadian Jobs Strategy as one which cuts across different sectors and responds to broadly-based labour market deficiencies. Nevertheless, the Department is also moving to upgrade its capacity to identify the potential for job creation in a sector like telecommunications and informatics. It was noted that the Canadian Occupational Projection Studies group was about to begin an examination, in collaboration with industry and union representatives, of future employment trends in the telecommunications sector. E & I officials indicated, however, that they did not expect to find telecommunications in Canada to be a major generator of employment in the coming years and our interviews confirm that this opinion is widely shared among other government departments and industry people.

Supply and Services. Procurement policy and the role of DSS came up on several occasions in our discussions of the IC/IP problem. While the Government Telecommunications Agency within DOC is primarily responsible for providing telecommunications services to the federal government, DSS normally contracts on behalf of government departments and agencies for office equipment and software. [GTA, 1985; Supply and Services Canada, 1985] As a result of the convergence of telecommunications and computers, this has led to some friction between the two on the interconnect side and with the new integrated office systems. In procuring office equipment and software, DSS follows an explicit policy of purchasing the best available product suitable for client needs at the lowest price but does allow for a modest "Canadiana" premium. Increasingly, as well, it is being requested to purchase interconnect and other equipment which effectively bypasses the GTA's services monopoly. DSS officials stressed that the Department's basic philosophy was that "competition gets you the best deal" but did

acknowledge that this can lead to difficulties because of less-than-perfect competition on the supply side, strong demand preferences for particular brands like "Big Blue" (IBM) or, occasionally, conflict between best available technology and "Canadiana" requirements. They also indicated agreement with vendor criticisms that pilot projects like DOC's OCS are not followed up in terms of having an impact on government procurement policy. With regard to trade issues, DSS officials indicated concern but no firm position about "free trade" with the U.S. and its possible impact on procurement as well as some consternation about having to meet GATT requirements when other countries are not always so meticulous. In short, while heightened competition in the telecommunications and informatics area is here to stay, there might be some modest room for using government procurement to achieve industrial policy goals.

Treasury Board. Treasury Board - as the federal government's overall management agency - has become increasingly involved with telecommunications and informatics in at least three ways. First of all, the Treasury Board is responsible for overall management of the telecommunications and EDP function within government and, as with all large and complex organizations, finds that these two functions take up a significant portion of operating expenditures. Initiatives have recently been made by Treasury Board to exercise greater control over these functions and provide for greater integration between them. Secondly, Treasury Board is responsible within government for implementing regulatory reform at the federal level, especially its procedural aspects. While telecommunications is not viewed as an area where reform is most pressing, government initiatives on regulatory reform are presently being prepared. And finally, Treasury Board is also playing a significant role in the

government's efforts at privatization. Privatization of Teleglobe Canada and, perhaps in future, of Telesat Canada would clearly change industry structure and regulation in the telecommunications field and affect government's capacity to use the policy instrument available to it. On each of these accounts, then, Treasury Board has at least an indirect involvement with the IC/IP problem.

The Department of Finance. In some respects, the most crucial department in terms of dealing with the IC/IP problem may well be the Department of Finance. Given the financial position of the federal government as it moves through the last half of the 1980's and the disposition of the Department of Finance towards competition, industrial policy and the use of certain policy instruments, many important issues relating to telecommunications and informatics may be decided on economic management grounds. Our interviews in the Department of Finance and in several other places within government directed us to the Minister of Finance's economic statement of November 1984 as the operative "game plan" within which governmental policy and practice must evolve. [Minister of Finance, 1984] Finance Department officials reflected very much the "hands off" approach for "framework policies" rather than sectoral strategies. With regard to competition and industrial policy, increased competition within Canadian telecommunications should be accepted and even encouraged as a practical matter and specific intervention to achieve industrial policy goals would have to be evaluated on its own merits. Employment, trade and R & D considerations were regarded as the major factors which the Minister would probably view as paramount. With regard to tax incentives versus subsidy programs, Finance officials tend to see them as two sides of the same coin in that they each affect the government's overall financial position, although they did express a mild bias in favour of tax incentives

but not the "hot-house" variety represented by the SRTC. In general, however, they indicated that the Department did not believe in interventionist measures or the pursuit of sectoral strategies but preferred to rely upon macroeconomic techniques and fine-tuning to achieve industrial policy goals. Within Finance, certainly, the "hands off" approach has become institutionalized and other federal departments and agencies interested in dealing with the IC/IP problem must grapple with this reality.

3.2 Major Players Within The Private Sector

In this section we will be examining and reviewing the findings from our interviews with firms and associations in the private sector, concentrating on their perceptions as to how increased competition can be reconciled with existing industrial policy. We will consider the experience of equipment manufacturers, the interconnect industry, the carriers, the industry associations, the major users and public interest associations including unions. All companies that we talked to acknowledged that they were facing increased competition as they tried to defend the position they already held, expand their market share or move into new markets. The overall perception was not only of intense and growing competition but also that circumstances were subject to rapid change. A company's market position could deteriorate very rapidly and, with this in mind, it was necessary to combine an ambitious research and development effort with a realistic assessment of market prospects and opportunities. All companies, large and small, saw a role for government in this marketplace but the nature of this role necessarily varied according to their circumstances. Thus larger firms tended to focus on framework policies such as tax treatment of research and development while

smaller firms saw the need for cash flow and guaranteed sales.

At the same time one tended to encounter varying degrees of dissatisfaction with government policies among those we interviewed in the private sector. This is not to suggest that our interviews uncovered seething discontent with government policy but that, in the course of our discussions of their corporate experience with government policy, certain recurring themes could be identified. These feelings tended to be of two general sorts - first as a result of what was viewed as the "heavy hand of bureaucracy" and secondly because of inconsistencies and contradictions in government policy. The general attitude seemed to be that government officials should be involved financially and only where their help was sought and that otherwise their role should be kept to a minimum. Of course this viewpoint runs up against traditions of accountability and budgetary control that government cannot easily ignore. As for the problem of contradictions and inconsistencies in policy, the belief was that government policies often worked at cross purposes or, more significantly, did not follow through far enough to produce the desired results. In general, this dissatisfaction reflected in part a general frustration with the usual internal conflicts and contradictions of government policy in a democracy. At the same time it also suggested a continuing need for even greater coordination in the delivery of government policy.

Whereas the corporations tend to focus on their individual relations with government and their specific response to growing competition, the carriers, users, public interest groups and unions are more concerned with the overall place of competition in the economy. Thus, their focus is on the desirable level of competition in telecommunications in particular and the proper role of the telcos as the focus of this industry. In this regard, there are substantial differences in the way the problem is

formulated but at least one common theme with differing consequences. Each group is concerned not to lose the benefits they now enjoy and yet to share in the benefits of the new technologies. Whether it be job protection and continued inexpensive local service or competition but only to the extent that it does not undermine the dominant position of the telco, a common concern underlay their position that the competitive forces at work could produce dramatic, disruptive and undesirable consequences if they were not properly channelled. We will be examining the specific positions and interests of many of these actors in the remaining parts of this chapter and, as we shall see, the pressures for change are massive and the demands on government's capacity to act are great.

The Telecommunications Common Carriers. The Canadian telephone industry is a mixture of federally, provincially and municipally-regulated companies of varying ownership, public and/or private, the largest of which are brought together for the provision of long distance service through the Trans Canada Telephone System (TCTS), now Telecom Canada. CNCP Telecommunications - an alternative common carrier providing certain nation-wide services - is a public-private sector partnership which is regulated by the jurisdiction within which it operates. Through rate of return reglation of the telco monopolies and the vertical integration of Bell Canada and Northern Telecom, the telecommunications market was essentially closed to outsiders. In recent years, this situation has begun to change as technological advances in telephony and in computer technology as well as regulatory and judicial developments in the United States have encouraged and persuaded regulators in Canada gradually to open up Canadian telecommunications markets to competition. In the face of these developments, the telcos have responded with initiatives intended to retain

their dominant market share as well as take advantage of new business opportunities. As major Canadian-owned companies, the telcos are widely seen to be crucial national and regional institutions in their jurisdiction, deserving special treatment and attention in the face of the new competition. At the same time, telco interests have come to diverge, one from another to varying degrees, and furthermore many businesses outside the traditional telecommunications sector have come to see the need for much greater competition in telecommunications as a means of lowering their costs and allowing them to take fuller advantage of the benefits these new technologies can convey. As major Canadian-owned firms operating in an increasingly international market where size is becoming a crucial advantage and in the absence of any significant presence by Canadian-owned firms in the computer communications and business services sector, the economic health of the telcos is becoming a central issue. Concomitantly, their competitors and many business users are determined that the health of the telcos should not be earned at the expense of the Canadian economy more generally.

Bell Canada is the largest telco in Canada, providing almost 60% of all telephone lines in Canada and generating over 50% of telco revenues. As a federally-regulated carrier Bell faces increased competition in many parts of its business but retains a monopoly position in local and long distance service. Bell's attitude toward competition has gradually evolved from one of opposition to one that is increasingly restive of regulatory impediments to its expansion into new markets. With respect to the central local service / long distance cross-subsidization issue, Bell favours rate rebalancing before competition for another carrier such as CNCP is allowed. In other areas, however, Bell Canada will be looking for new markets to make use of the major increase in network capacity expected by the end of

the decade with the completion of its national fibre network. In essence, Bell Canada would like to be allowed to retain its monopoly markets while simultaneously fully competing in the new markets evolving from the merging of telecommunications and computer technologies. [Bell Canada, 1983] British Columbia Telephone's position is not overly different from that of Bell in terms of specifics, although more strident in character, and both New Brunswick Telephone and Maritime Telephone and Telegraph seem to be gradually adopting positions similar to that of Bell Canada.

However, a major area of difference has developed among the telcos with the prairie telcos, especially Saskatchewan Telephones (Sasktel) and the Manitoba Telephone System (MTS), becoming very strong opponents to both increased competition and any lowering of long distance rates as a result of rate rebalancing. The three prairie telcos are owned by their three respective provincial governments. In Manitoba and Saskatchewan in particular the telcos are explicitly there to serve government policy. As such, these telcos are more clearly subject to political intervention. The general thrust of the views of Sasktel and MTS with respect to competition and industrial policy is that competition should be resisted in the traditional telephone markets, rates should be left intact where possible and the telcos should be allowed to expand unregulated into related business communications markets where they feel opportunities await them.

CNCP Telecommunications has been the major proponent of greater competition among the carriers. In particular, it has sought the right to compete with Bell Canada and B.C. Tel in the long distance market and, although its application was denied in August 1985, CNCP has subsequently asked for review of the decision in late 1985. CNCP does not seek full and open competiton but rather the opportunity to offer, under conditions of

regulated competition, a long distance service competitive with that of Bell and B.C. Tel. CNCP has also championed the need to re-organize the regulation of telecommunications in Canada through some joint federal/provincial regulatory board. [CNCP Telecommunications, 1983] The absence of a consolidated national market makes competition difficult, constrains previous regulatory gains, such as system interconnection, that have facilitated limited competition and prevents the development of a coherent national industrial policy in telecommunications.

Northern Telecom and Other Major Equipment Manufacturers. Northern Telecom is generally recognized as Canada's leading "high tech" multinational and its success and circumstances suggest it is best to consider it separately. [Northern Telecom, 1984] Canadianized in the wake of the 1956 Consent Decree in the United States, Northern Telecom took a dramatic step forward in the 1970's from being a traditional and comprehensive telco supplier to investing its future in the applicability of digital technology to the future of telephony. Northern has been remarkably successful in its decisions and its ability to implement those decisions and it is now safe to say that, while analog transmission will be around into the next century, Northern has helped to make digital the dominant technology while establishing itself as a world scale actor in the industry. As it has grown in stature, with 1984 revenues in excess of $4.36 billion, Northern Telecom has come to rival AT & T in the North American market for central office and PBX equipment and, at the same time, continues to be an innovative and comprehensive supplier for Bell Canada and other telcos in Canada. At the same time it remains the major equipment supplier in Canada with manufacturing plants in virtually all provinces as part of its own private industrial strategy. Northern describes its present corporate relationship with Bell Canada as horizontal

rather than vertical following the creation of Bell Canada Enterprises (BCE). As Bell Canada's supplier Northern must supply Bell but Bell did not have to buy its equipment from Northern.

As Northern Telecom has evolved so too has its relationship with the Canadian government and the Canadian market. While BCE controls just over a majority of its equity, in recent years Northern has been concentrating its expansion in the United States market where, since the AT & T divestiture, the bulk of its new market potential is found. Thus, in 1984, 64.5% of its total revenues were derived from the U.S. market and almost 52% of its tax liability was to U.S. governments. As a result, although it is Canadian owned, Northern is very much a world scale multinational and its interests and policy concerns reflect this status. For instance, Northern is very supportive of free trade and, indeed, any measures that reduce or eliminate barriers to competition, especially outside Canada. At the same time Northern must continually fight its perception in the United States as a "Canadian Company" and a free trade agreement might ease this problem considerably. Northern is also upset over the tax treatment by Revenue Canada of development costs, especially those carried out on the shop floor, as distinct from "sky blue" research activities carried out in "stand alone" facilities, arguing that the operative definition is excessively narrow. Finally, as Northern Telecom seeks out new markets outside North America to maintain its high rate of expansion, the need for active government support is increasing because, unlike in North America, many of these purchase decisions are made as much for political reasons as for economic reasons. Since the Canadian government wishes to encourage Northern to sustain its headquarters and R & D activity in Canada, then the government may find it useful to continue and even expand its role as "the

government behind Northern" in its dealings with foreign governments.

Other large equipment suppliers include Mitel, Spar Aerospace, Canadian Marconi and AEL Microtel but our comments will be reserved to the first three on this list, the ones with which we conducted interviews. Before discussing the specific experience of these companies some general observations seem appropriate. Most of these companies are what might be called "niche multinationals" in that their revenue base is greater than that normally associated with "niche" firms in Canada but, at the same time, they have a fairly narrow product line as is characteristic of the niche firm. The narrow product line tends to leave them highly exposed in the face of increased competition in that any failure to sustain or expand market share in that area can be fatal to the company's long term viability. More importantly they face constraints in their development in that their relative size and pressures from the stock market to sustain their continued expansion both encourages and may even force them to test their success in new product areas in order to sustain investor interest. This form of expansion will test the efficiency and organization of the firm, something that may be in short supply in young high tech firms.

Probably the most famous firm in this group is Mitel, initially a maker of small PBXs and a company that was a great Canadian success story through the late 1970's and early 1980's but which, since 1984, has fallen on hard times reporting yearly losses through 1984 and 1985. [Mitel, 1984] With total revenues of $370.8 million and R & D expenditures of $59.7 million in 1985 Mitel is very much a multinational with the Canadian market providing only 20% of total sales but 40% of its total employment. Mitel's troubles date from its decision to enter the large PBX market, with the SX2000, and its failure to bring the product onto the market in time. A budding but ultimately unsuccessful relationship with IBM which was in

search of an equipment manufacturer to strengthen itself in the telecommunications market, the timing of the AT & T divestiture which required the premature introduction of the SX2000, and internal organizational and personnel difficulties within the company all conspired to undermine Mitel's fortunes. IBM eventually broke its agreement with Mitel when it became apparent that Mitel could not deliver the SX2000 in time for IBM to take advantage of pressing market opportunities. The loss in investor confidence that resulted left Mitel struggling to compete against better financed and more broadly-based competitors. This problem may now be partially resolved with approval of the 51% takeover of Mitel by British Telecom and the broader financial base it will be able to call upon. Mitel remains a success story in the eyes of some observers and one of the factors contributing to this has been the federal government's grant programmes which provided it with substantial funding especially in its early years. More critical observers suggest that the support encouraged Mitel to grow too quickly and to expand beyond its capabilities. The new tie with British Telecom, although it involves a foreign takeover of a firm that has received substantial funding from the Canadian government, is viewed by some as beneficial for Canada in the longer term insofar as it allows Mitel itself to prosper and grow in an intensely competitive market and to the extent that a reasonable proportion of future expansion occurs at its headquarters in Kanata.

Spar Aerospace, which until 1977 was a division of RCA, is a second Canadian "niche multinational" with 1984 revenues of $190 million. It develops and manufactures products for the aerospace, communications, defense and aviation markets, with about two-thirds of its revenue derived from the space and electronics market, and is most famous for its Canadarm

designed for the Columbia and Challenger space shuttles. Spar, like Mitel, has been a major beneficiary of government grants - in one of our interviews it was described as virtually a part of the DOC while others saw it as a "chosen instrument" of the government - and faces increased competition as it attempts to diversify more into international markets. Spar spokesmen were most concerned about the apparent willingness of the federal government to support other Canadian competitors like AEL Microtel, a policy which it believed not only undermined its capacity to grow and compete but also made it look suspect in the eyes of potential foreign customers. Furthermore, when Spar faced competition from another Canadian firm internationally, the result was to neutralize any contribution by Canadian government officials when, in fact, such political intervention could well be crucial to winning a contract. Over the longer term, Spar may also be handicapped by its involvement with a technology that seems increasingly dated and destined to play a more peripheral role in the communications sector.

Canadian Marconi is 51% owned by its British parent, much like Mitel, and operates largely in the North American marketplace. [Canadian Marconi, 1984-1985] Canadian Marconi's financial success and viability, with 1984 revenues of $314 million, rests to a very considerable extent on the great success of one radio set, the AN/GRC 103, which was adopted by the U.S. Army in the early 1960's and produces about one-half of its total revenue. This product is now being totally redesigned and Canadian Marconi faces considerable competition from domestic U.S. companies over the awarding of this new contract. With its very narrow product base, Marconi would be highly exposed if these contract negotiations did not work out favourably. With much of its market in the United States, Canadian Marconi has been a particular beneficiary of the Defense Production Sharing Agreement (DPSA)

which is effectively a sectoral free trade agreement and which has allowed Marconi to operate almost entirely out of Montreal. Marconi is especially supportive of the retention of DPSA and favourably inclined toward the development of other similar arrangements in other sectors. Marconi has faced some opposition in the guise of "national security" considerations within the United States as a result of its perceived Canadian nationality, including an unsuccessful intervention by President Nixon in the early 1970's. However, while Canadian Marconi expressed considerable concern about the potential impact of "Buy American" programs it does not regard these non-tariff barriers as a great threat as yet to its ability to do business in the United States.

In concluding this section it should be emphasized that the circumstances facing each firm varies considerably making useful generalizations difficult to formulate. However, all firms interviewed did stress the crucial importance of governmental intervention whether in the form of grants, political support in foreign markets, or through trade arrangements like DPSA and, with the exception of Spar, failings in governmental policies were not seen to be central to the present problems faced by these firms. Finally, our interviews suggest that niche multinationals may require considerable on-going support and cooperation from government, assistance that must be coordinated and aimed at all stages of their evolution and not just when they are starting up.

Medium and Small Equipment Manufacturers. This grouping includes firms like GEAC, Norpak, Gandalf and SED Systems but our comments will be confined to the first two, GEAC and Norpak, with whom we had interviews. The companies in this category are of modest size, mostly less than $100 million in total revenues, are often oriented towards export markets and

are true "niche" firms in that their product lines and revenue base are relatively narrow. Most of these firms are in the informatics sector, producing and selling equipment and software that meet a specific need. Although modest themselves, these firms operate in a huge market, estimated in Canada alone at over $4.5 billion in 1984, in which Canada has a large and growing deficit and which is dominated by very large and powerful foreign multinationals like IBM. As most office equipment decisions are made by EDP specialists, many of whom are accustomed to dealing with IBM products, these Canadian companies face a significant bias against domestic firms within their home market. Given the odds that they face one might anticipate that these firms would be particularly receptive to and in need of government assistance. In fact, however, they were among the most critical of government support programmes.

GEAC Computer Company is Canada's only home grown mainframe computer maker. [GEAC, 1985] Its major markets are for library services and, more recently, financial services. It has offices in Canada, the United States and the United Kingdom and appears to be doing well, especially in its foreign markets. Recently GEAC has been attempting to expand into the U.S. financial services market but it is facing tough competition, including competition from IBM which has chosen to re-enter the market. GEAC's major concerns were with inconsistencies in government policies. For instance, while the OCS program was intended to provide selected firms or consortiums with an opportunity to develop and sell their product to the federal government and others, the PMO has recently contracted for a communications system that uses largely U.S. equipment and software and is coordinated by Gandalf to give it an air of respectability. GEAC regards procurement policy as one of the major areas of weakness in Canadian federal industrial policy with the result that positive initiatives are dissipated from lack

of follow-through by government. While GEAC's dissatisfaction with the impact of government policy may not be representative of suppliers as a whole, their critique deserves further assessment especially as regards the appropriate role of procurement policy.

Norpak is a company concentrating on the development and sale of systems for the teletext and videotext markets. Founded in 1972 it does most of its business outside Canada - only 5% of its 1984 business was in Canada while 85% of its sales were in the United States. Norpak most recently has been through what it regards as a very unhappy experience with the DOC's Telidon project which put the company in financial jeopardy and, to a very considerable extent, this has coloured its outlook on grant programs administered by government officials. However, it is by no means clear that government grant programs were the only source of its difficulties. Thus, in general, Norpak is very critical of grant programs per se, favouring the use of the tax system and tax credits in particular. The major exceptions to their criticism of grant programs were the PILP and IRAP programs largely because they were more generous with their financing. Norpak is supportive of the need for an industrial policy but felt it should focus on goods where Canada could be competitive. The proper role for government was the provision of framework policies such as tax measures because government was particularly ineffective in situations that involved risk, innovation or decisiveness. Internationally, spokesmen felt the key problem was one of the excessive documentation demanded by customs officials and while they were supportive of free trade they were uncertain whether this problem would be resolved by the free trade negotiations.

The interconnect industry is one that was created by regulatory

decisions, the cumulative effect of which were that it is now possible for individuals and firms to own their own subscriber terminal equipment. In the wake of the 1980 decision a highly competitive industry emerged in the areas served by Bell Canada and B.C. Tel (and now in several other provinces) which, by the end of 1983 had captured 8.7% of the key telephone systems and PBX markets in Canada and, by 1985, had cumulative sales of about one billion dollars. [Northern Business Intelligence, 1983] Most of the firms in this industry retail equipment made by other manufacturers - mostly offshore suppliers - rather than producing their own product, and since 1982 the interconnection industry has been joined by the carriers themselves as they have struck back aggressively in an effort to protect their market dominance. Interconnect firms have been most successful in the markets for residential phones - in the more sophisticated multi-line systems customers more strongly prefer the strong back-up service provided by the carriers. The major policy concerns of this industry have been that the regulator should mandate more competition within the equipment and services sector and that competition should be "fair," an issue that is at the heart of another regulatory debate, the separate subsidiary issue. Members of the industry are also supportive of free trade in telecommunications equipment. There are four dominant firms in this industry - CTG Telecommunications Systems, Bell Communications Systems Inc. (BCSI), Rolm Corporation of Canada, and Telecommunications Terminal Systems (TTS) - who collectively had captured 47% of the market by 1984 and over 120 other smaller vendors active as well. The two firms that we will discuss, Trillium and Ericsson, are respectively a small key system distributor and a firm that has withdrawn from the interconnect market.

Trillium Telephone Systems sells key systems of ten lines or less in both Canada and the United States. [Trillium, 1985] A subsidiary of Mitel,

which holds a 70% stake in it, Trillium has about 4% of the U.S. market and 30% of the Canadian market for key systems. Trillium buys and imports its products from Japan and Hong Kong but recently it has begun producing its own equipment as a means of securing its supply from interruption. From Trillium's perspective, government's role was most crucial at the start-up stage where it could be a source of support, especially in helping a firm secure an adequate line of credit. In Trillium's case, it was Mitel itself that ensured Trillium's financial viability. Further, Trillium does not see much hope for key system production equipment industry in Canada and views the Enterprise Development Program's Canadian production condition in which DRIE imposed its loan to Trillium as too onerous.

Ericsson is a Canadian subsidiary of California-based Ericsson Communications, itself jointly-owned by Atlantic Richfield and the L M Ericsson Telephone Company, a company about the size of Nortel, and has operated in Canada since 1953. Ericcson has a limited presence in the Canadian market and the subsidiary was established largely because of the tariff. In 1985 Ericsson decided to completely pull out of the Canadian interconnect market and concentrate on its growing business in cellular switches sold to Cantel through Novatel as well as office work stations largely because the interconnect market profit margins were too low. As a supplier to a telco, Ericsson understands the circumstances that make the interconnection market inherently competitive, in particular the considerable advantage that telco suppliers have over smaller equipment retailers and thus has chosen to concentrate on more lucrative markets.

Various Industry Associations. The industry or trade associations are openly pro-competitive, and stress the virtues of competition both for the telecommunications network per se and for the economy more generally.

Industry associations in the telecommunications sector are united in their desire for more competition and less regulation and that when the telcos get involved in related markets they should do so through separate subsidiaries. The associations are all concerned about the constitutional division of powers in communications and the capacity of certain provinces, especially the prairie provinces, to impede the development of competition. We will discuss the views of several representative organizations.

The Association of Competitive Telecommunications Suppliers (ACTS) has 90 corporate members including manufacturers, distributors and other firms involved in the provision of telecommunications goods and services including some that manufacture in Canada. Formed in July 1983 to promote competition it is active lobbying government about regulatory issues and intervening in the regulatory process. ACTS members are concerned about the constitutional division of powers in communications and views provincial regulators as a "mixed bag" in terms of their views of and support for competition - some are hamstrung by legislation (Saskatchewan), rubber stamp telco decisions (Alberta) or are more active and pro-competition (Nova Scotia). ACTS members would like to see increased competition and less regulation and feels that DOC's concern about the possible overbuilding of telecommunications facilities as a result of competition is unjustified since competitive facilities will prevent Canada from being locked into a dated technology and serves as a positive incentive for manufacturers. ACTS members also believe that separate subsidiaries are a necessary part of any fair competition with the telcos - otherwise the inherent advantages of the telcos as network suppliers provide them with too many opportunities for cross-subsidization. ACTS is critical of the DSS and GTA procurement practices and, while it has no formal position on free trade, it tends to view it favourably. Finally it

has no clear position on the question of policy instrument usage, regarding tax incentives and subsidies as equally desirable.

The Canadian Business Equipment Manufacturers Association (CBEMA) is a trade association representing over 60 corporate member firms in the information processing, office equipment and office furniture business with 1984 sales of over $7 billion of which 20% were exports. [CBEMA, 1985] Over 80% of CBEMA's membership are foreign subsidiaries, a good number with world product mandates, and the organization is said by some to be dominated by IBM Canada. Traditionally, CBEMA members have been hardware manufacturing firms but more recently the organization has sought out new members among firms in computer and value-added services. CBEMA members share the concerns of other industry associations for increased competition and less regulation placing particular weight on resale and sharing and nationwide interconnection. As well, CBEMA is especially concerned to argue that the nationality of a company's head office should not be a factor in Canadian industrial policies, in the use of tax incentives and subsidies or in government purchasing policies. Thus with respect to procurement policy DSS should continue to purchase goods and services as much as possible from the lowest bidder and not allow nationalistic or fashionable industrial policy goals to intervene in the bidding process. Government's role should be to determine the economic climate and the less involved it is in the details of business decisions the better. CBEMA is also a vigorous proponent of free trade with the United States, something that would benefit all of its member companies, and in telecommunications in particular it supports the elimination of the 17% tariff on equipment.

The Canadian Advanced Technology Association (CATA) is an industry association with 170 members mostly smaller Canadian-owned companies and

including about 115 corporations as well as institutions (i.e. universities), consultants, high tech firms and individuals. Most of its members are active not only in the Canadian market but export over one-half of what they produce with much of this going to the United States. CATA has a public image of being very nationalistic in its representations and is attempting to change this perception by broadening its membership base and viewpoints. Thus, since 1985, membership has been opened to non-Canadian controlled corporations as an attempt to help CATA better represent the increasingly international character of the industry. CATA membership itself only touches the surface of the Canadian electronics industry, which is variously estimated to include from 1500 to 2500 firms and includes firms in markets other than telecommunications and the information business as well. CATA members are most concerned about the need for increased financial support for the industry at both the research and development stage and for market development. While CATA has favoured the use of subsidies in the past, it now leans toward more dependence on the tax system. CATA supports measures such as the SRTC (which it believes should have been tightened rather than eliminated), "flow-through shares" and better access to pension fund investment capital and would like to see improved access to financing not only at the research stage but also further along at the stage of market development. Most CATA members are already active selling in the U.S. market and encounter few impediments there so they perceive few benefits to be gained from any free trade agreement and fear the potential threat of disruption to government support measures.

Other Interested Parties. There are a wide variety of other interests and voices that seek representation in the debate over the place of competition in Canada's industrial policy for telecommunications. We will

discuss the views of three such groups - business users, unions, and public interest groups. At the most general level one might say that all spokesmen seek to maximize the advantages and minimize the disadvantages of telecommunications advances for their constituency. Beyond this, however, their interests sharply diverge. Business users are primarily concerned to maximize the benefits from new communications technologies in order to raise productivity and enhance competitiveness. The trade unions, on the other hand, are concerned to protect jobs, wage rates, the union's status and membership, while retaining some of the established benefits of the present regulatory regime, especially low local service costs. Finally, there are the interests of ordinary consumers, themselves a highly heterogeneous group if only because of disparities of income, and the efforts of groups to define and articulate these interests in a meaningful way.

Turning first to business users there are many bodies, whether organized groups or individual corporations like the Royal Bank, that have pressed for greater competition among providers of telecommunications goods and services. One such body is the Canadian Business Telecommunications Alliance (CBTA), formerly the Candian Industrial Communications Assembly (CICA), which represents the interests of 230 business telecommunications users across Canada and is essentially an organization of middle management telecommunications user officers. CBTA is very supportive of an industrial policy in telecommunications that emphasizes competition as the best engine to ensure Canadian business will have access to the latest and most appropriate goods and services at competitive prices. As such its major focus is on the regulatory decisions of the CRTC. CBTA is a strong proponent of the argument that carriers should only be able to compete in

the new business equipment and service sectors through separate subsidiaries as part of their overall push for cost-based pricing in the whole area of telecommunications. It is also highly critical of the "regulatory nightmare" that they see in communications more generally, a situation that defies the rational development of policy that will promote the general interests of business for the lowest cost telecommunications possible. The basic thrust of this group is to rationalize policies that effect the efficient use of telecommunications by Canadian business. At the same time it has no clear position on the desirability of negotiating free trade with the United States.

The Consumers Association of Canada (CAC) is generally recognized as the main spokesman for the interests of the "ordinary consumer". A non-profit, voluntary, grass-roots organization, the CAC has been very active in the telecommunications area through its regulated industries program, maintaining a "watching brief" on the industry. The CAC has been largely pro-competition, seeing it as a means to increasing consumer choice and welfare and, at the same time, has been concerned that the CRTC be able to continue regulating the carriers in order to control any anti-competitive behavior that they might mount. However the CAC is also concerned that low local service rates should be maintained. Thus CAC support for cost-based pricing which is one likely result of increased competition, runs up against its concern to retain a significant degree of cross-subsidization of local service rates.

The Communications Workers of Canada (CWC) is one of the major unions in the telecommunications sector, representing workers with both the carriers and manufacturers including parts of Bell Canada's staff, many employees with Atlantic Canada telcos as well as in Manitoba and Saskatchewan and all employees of Northern Telecom. The union structure in

the industry is highly complex with the employees of many telcos represented by more than one union. The CWC does not have any explicit position on the proper industrial policy for this sector but is concerned about the potential impact of competition on prices as well as on union strength and would clearly like to see government continue to be active regulating the telcos. CWC is concerned that competition and cost-based pricing will eventually lead to telephone rates that are too high for many low-income workers. Further, the CWC worries about the future of unions and the union movement in telecommunications and its related sectors because many of the firms in this area are quite anti-union in their attitude and there are continuing job cutbacks and pressure on existing wages occurring throughout the telephone system. This concludes our "overview of the landscape" with regard to the increased competition/industrial policy problem.

CHAPTER FOUR: TELECOMMUNICATIONS POLICY AT THE NATIONAL LEVEL AND ITS INTERACTION WITH OTHER GOVERNMENT POLICIES AND PROGRAMS

Up to now, we have concentrated on describing the increased competition/industrial policy problem and its various manifestations and outlining the views and interests of the major players involved. In this chapter and the next, we discuss how the IC/IP problem can be confronted at the national level and what actions might be taken in terms of telecommunications policy and other government policy. At this point, it is necessary to briefly recap our treatment in Chapter One of the three levels on which any reconciliation of increased competition to industrial policy can be analysed. At the meta-policy level, it is necessary to adopt a "policy about policy". The government has effectively done this with its expressed and legitimate preference for a "hands off" rather than a "hands on" approach. [Minister of Finance, 1984] On the macro-policy level, it is apparent that any telecommunications policy which is forthcoming will have to fix an approximate degree of competition and a priority to be ascribed to industrial policy considerations among its objectives and follow this up with appropriate organizational and operational support for that specification. As well, a variety of other governmental policies and programs will have to be harnessed to telecommunications policy if the IC/IP problem is to be dealt with effectively. And finally, government will have to link meta-policy and macro-policy to the micro-policy level by rethinking and adjusting its use of policy instruments in responding to the specific situations which the IC/IP problem raises. In the present chapter, we will examine the need for change at the meta-policy and macro-policy level.

4.1 Federal Telecommunications Policy: Objectives, Organization and Operative Principles

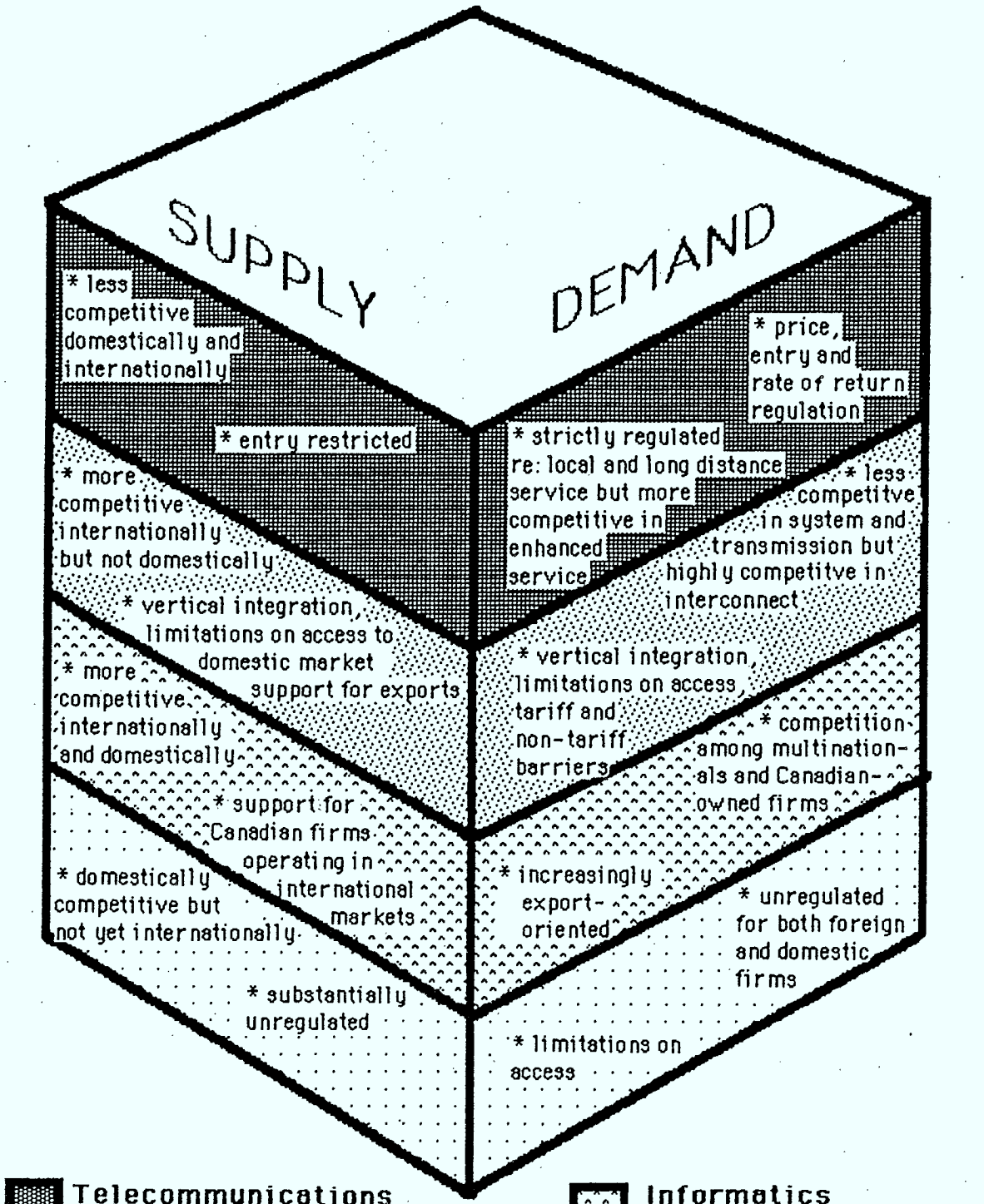
Telecommunications policy at the national level in Canada has long been based upon a low level of sectoral competition and an implicit set of industrial policies which grew out of traditional forms of "regulated monopoly". Since the late 1970's, Canadian telecommunications has moved more towards a state of "regulated competition" where the domestic level of sectoral competition has increased at least marginally but the environment wherein competition operates remains regulated. Of even greater importance, rapid technological advance and international market pressures continue to work in the direction of greater competition and there is an important shift in the appropriate frame of reference (and relevance) from a narrow focus on the telecommunications sector toward a broader conception of the "information business". [Woodrow and Woodside, 1984] Throughout this considerable evolution, traditional industrial policies relating to Canadian telecommunications have remained largely unchallenged and unchanged. However, increased competition and that implicit set of industrial policies are not always compatible, hence the problem of reconciling increased competition to industrial policy in the telecommunications and informatics area. An effective telecommunications policy at the national level in Canada must make provision for just such a reconciliation in terms of appropriate policy objectives, organizational structures and operative principles.

It would simply be wrong to presume that there was no scope for competition in the "regulated monopoly" condition prevalent in Canada prior to the 1980's but the level of competition was clearly maintained at a low level. There has been no effective competition evident in local service since the early days of the telephone in Canada; CNCP Telecommunications -

or at least its predecessor organizations - were recognized by government since early in the century and allowed to provide private line services but there was no interconnection which would have allowed for more extensive forms of long-distance competition; only a very minimal amount of intermodal competition between telephones and telegraphs was operative and newer forms of intermodal competition like cable or satellites has been tightly controlled; and finally, vertical integration among Bell Canada, B.C. Tel and their respective carriers as well as restrictive terminal attachment policies at both the federal and provincial level meant that there was very little competition on the supply side. What has happened since that time has been the emergence of "regulated competition" where restrictions on supply-side competition within the telecommunications sector have been steadily and substantially relaxed in Canada while demand-side competition has been slower to evolve. Moreover, this schema must be further disaggregated in terms of the carrier and equipment manufacturing elements within the telecommunications sector.

Figure IV provides a graphic representation of the relationship between increased competition and industrial policy in the telecommunications and informatics sectors in Canada. On the supply side, equipment manufacturers operating in both the network and interconnect markets face a highly competitive situation. Despite the continuation of vertical integration, Northern Telecom, Mitel and, to a lesser extent, Microtel sell much of their products increasingly into foreign markets while the domestic interconnect market has become substantially competitive since 1980. In terms of the supply of services as opposed to equipment, however, the carriers are only now poised on the edge of real competition with recent decisions on enhanced services, resale and sharing, and the continuing possibility of interexchange competition. From the demand-side

FIGURE IV: The Relationship Between Increased Competition and Industrial Policy in the Telecommunications and Informatics Sectors



perspective, the strongest pressures for increased competition bear upon the carriers where large business users seek, in particular, to reduce the costs of long-distance service at the same time that everyone has an interest in keeping increases in the price of local service as low as possible. However, telecommunications manufacturers also face demand-side competitive pressure particularly in the form of the need for continuing technological advance to meet consumer needs and to counter competition from foreign suppliers. [Price Waterhouse Associates, 1981 and 1985] Finally, one must remember that the telecommunications sector is part of the broader "information business", and increasing competition between telecommunications carriers and manufacturers and computer companies in the supply of office communications systems and services is only the most prominent example of this broader form of competition. Thus, even as compared to five or ten years ago, the level and degree of competition within the present state of "regulated competition" in Canada has increased substantially, shows every evidence of continuing to increase, and to pose a fundamental challenge for telecommunications policy and regulation.

On the other hand, industrial policy relating to the telecommunications and informatics area has remained remarkably the same over this period. Government has followed a set of largely implicit industrial policies, both as expressed through telecommunications policy and practice and through other government policy and programs, which have attempted, first, to sustain a nation-wide telecommunications network and a world-class equipment manufacturing capability and, second, to encourage the creation and growth of as many Canadian-controlled firms as possible as well as maximum utilization of domestic carrier facilities and maximum domestic manufacturing by foreign-controlled firms operating in Canada.

[DOC, 1979] This has been the fundamental and unchanging goal of governments over the years in dealing with industrial policy considerations relating to telecommunications and informatics. Towards this end, a number of implicit if not explicit lines of policy development have been followed:

* Entry, price and rate of return regulation of monopoly telecommunications carriers has been viewed as essential in order to build and maintain the network and to protect subscribers.

* Vertical integration between major carriers and equipment manufacturers came to be accepted as useful in building a world-class manufacturing capability.

* A modest role for public ownership and control, as evidenced by the establishment of Teleglobe Canada, Telesat Canada and CN's role in CNCP as well as DOC's various activities, within a sector where private enterprise predominates.

* The availability of various subsidy programs to support research and development and other preferred activities and, more recently, the growing use of tax incentives.

* Support for strong Canadian presence in the domestic telecommunications market, both with regard to carriage activities and equipment supply, by means of a variety of measures including foreign investment review.

* Encouragement through trade promotion and financing assistance for Canadian firms attempting to sell into the world telecommunications market.

All of these elements fit together as an implicit industrial strategy which government has continued to follow even as increased competition has become evident.

The problem which now faces policy-makers is that increased competition is more and more often coming into conflict with that implicit industrial strategy. If either of these policy thrusts were to be pursued absolutely, the contradiction between them would become acute and government would face a Hobson's choice, i.e. it would have to sacrifice one for the other. There is little evidence, however, to suggest that this need be the choice. Neither the substantive case for increased competition in the Canadian context nor the political pressures on government are so

overwhelming as to force government to pursue such an initiative exclusively. Likewise, the implicit industrial strategy which government has followed in the telecommunications sector is not so antithetical to increased competition on a practical level nor so inflexible vis-a-vis different means to achieve its ends as to preclude change and adaptation. As we have emphasized throughout this report, the task facing policy-makers is to reconcile increased competition to prevailing industrial policy considerations not only with regard to the telecommunications sector narrowly but within the broader "information business". As well, since the 1984 election at least, it has also become clear that any reconciliation must take shape within the context of the government's "hands off" approach to policy-making and the role of government. [Minister of Finance, 1984] How, then, should specific policy objectives be set out? What changes in organizational structure might be useful? What operative principles should be followed in dealing with the IC/IP problem?

Specification of Policy Objectives. Telecommunications in Canada at the national level has long suffered from a failure to set down specific policy objectives. This deficiency has been pointed out by several commentators in the past and lamented by many governmental and industry people in our interviews. [Creery, 1982; Clarkson, Tetrault, 1985] On the part of DOC, the failure to evolve clear policy objectives has not been for want of trying as important initiatives during the 1970's and the present telecommunications policy review attest. What has inhibited the evolution of clear policy objectives for telecommunications policy at the national level is two main difficulties: first, inability on the part of policy-makers to agree on what objectives should be included and, more importantly, the priority to be given to particular objectives; second,

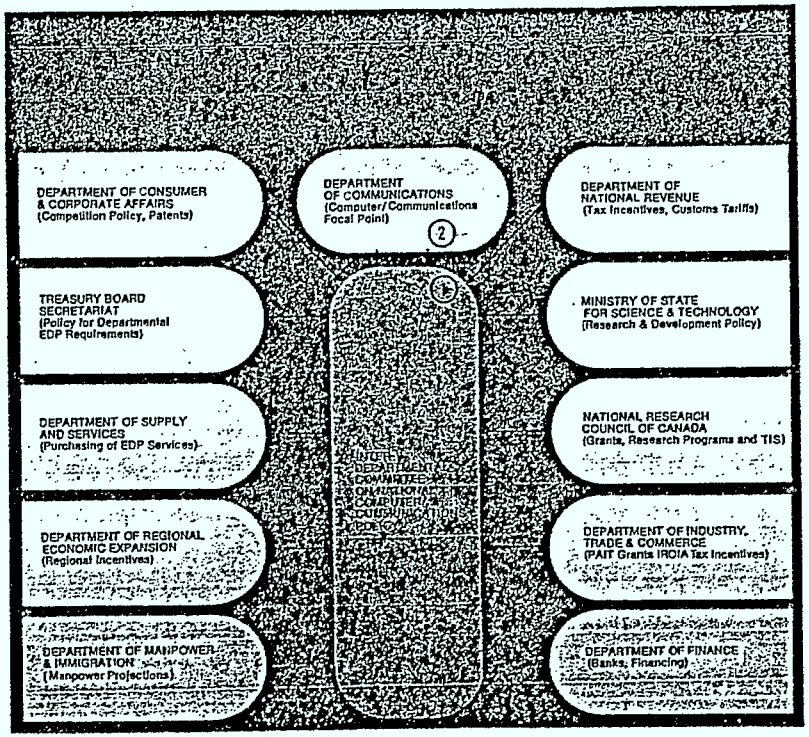
opposition or perceived opposition from other federal departments and agencies, industry interests, the provincial governments, or the public at large to explicit specification of policy objectives and their priority. In these circumstances, it has thus far been easier for government to shrink from any precise specification of policy objectives and the priority to be assigned to them. This has been precisely the case with regard to increased competition and industrial policy considerations as we will now proceed to demonstrate.

The earliest efforts at planning within DOC were associated with the Telecommission studies and culminated in the overview report entitled Instant World. That report held out the prospect of a "brave new world" of cable, satellites, computers as well as the existing telecommunications networks which could offer a wide variety of new goods and services both to business and the average consumer. In this broad sweep, however, there is virtually no attention to the role of competition in providing those goods and services and only a little more emphasis on the industrial policy considerations bearing upon Canadian telecommunications. [DOC, 1971] Associated with but separate from the Telecommission effort was a Task Force on Computer/Communications which did considerably more thinking about competition and industrial policy matters. Its report, Branching Out, viewed computer/communications as "a key area of social and industrial activity" and, in a much more prescient way than Instant World, sketched out the diffusion of computers and new telecommunications services through the 1970's and 1980's. [DOC, 1972] More to the point, it provided an approach and set of recommendations which married competition to industrial policy in terms of two main concepts:

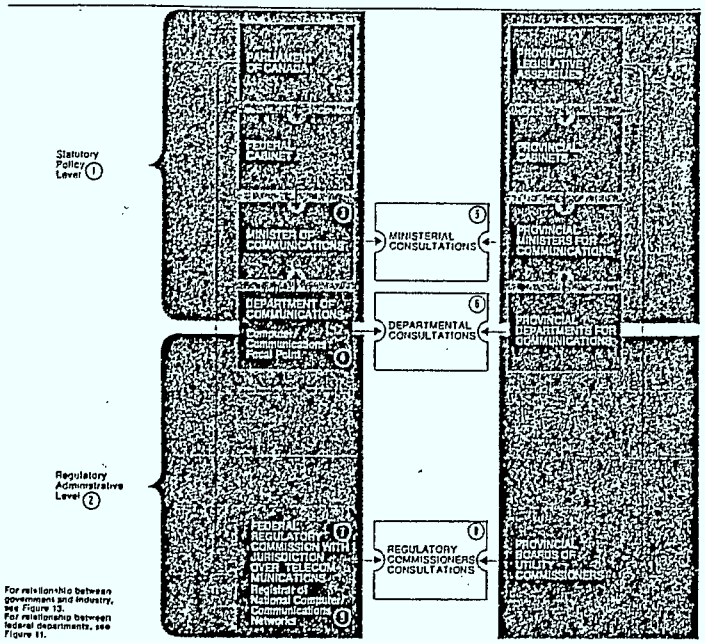
> first, a strong emphasis on maintaining and developing a competitive and innovative industrial environment throughout the whole field of computer/communications

INSTITUTIONAL ARRANGEMENTS AS RECOMMENDED BY THE TASK FORCE ON COMPUTER COMMUNICATIONS - 1972

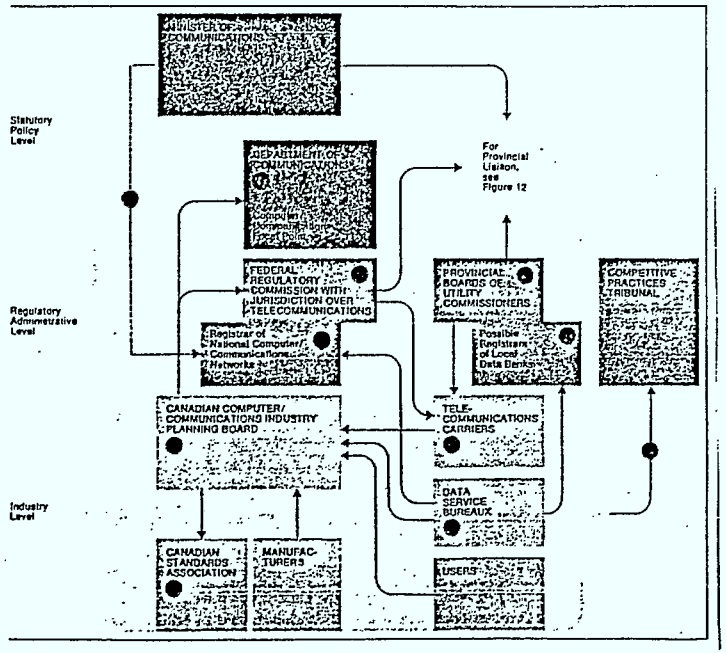
Suggested Institutional Arrangements at the Federal Departmental Level



Suggested Federal-Provincial Liaison for Computer/Communications Policy



Suggested Government-Industry Relationship for Computer/Communications



> ...; and second, a strong emphasis on the role of government in fostering the development and self-reliance of industry, and in maintaining a proper degree of Canadian independence in the field.

Most importantly, it was adamant that DOC must become the "Focal Point" for government efforts, aggregating the views and interests of other departments and agencies and also of the provincial government. It emphasized the role of DOC in strategic planning and program coordination but made clear that the private sector would bear primary responsibility for the evolution of computer/communications, although even here relatively small changes in government policy on matters like interconnection or terminal attachment or R & D funding could significantly affect the overall telecommunications and informatics area. Looked at fifteen years later and with the benefit of hindsight, one wonders whether this report might not have been utilized more extensively by government in identifying and formulating appropriate policy objectives for telecommunications policy.

The second attempt at determining policy objectives evolved within the context of federal-provincial relations and involved the issuance by the federal government between 1973 and 1975 of two Green papers and a Gray paper as well as the provincial governments' strenuous response and counter-proposals. In its first Green Paper on a national communications policy, the federal government sought to establish an overall policy for broadcasting as well as for telecommunications and focused primarily on jurisdictional and regulatory concerns. Competition and industrial policy concerns were minimal and never really became a major source of contention. [Government of Canada, 1973a] Even its second Green Paper on computer/communications significantly diluted the vision which the previous Task Force had put forward and federal government efforts themselves became bifurcated between DOC and ITC and increasingly bogged down in

interdepartmental wrangling. [Government of Canada, 1973b] In any case, jurisdictional and regulatory concerns soon became paramount and the provincial governments formed a "common front" in opposition to the federal proposals. By 1975, conflict over communications policy at the federal-provincial level had reached a stalemate with both levels of government holding firm to their positions and little possibility for compromise. One major casualty of this conflict was the possibility - slender though it may have been - that the federal and provincial governments together might have been able to evolve a clear set of policy objectives for Canadian telecommunications.

The next major attempt to evolve policy objectives took the form of the federal government's ill-fated telecommunications legislation of the late 1970's. Consciously aping the Broadcasting Act, the proposed legislation first introduced in the House of Commons in 1977 contained a "Section 3" which outlined an elaborate set of policy objectives for Canadian telecommunications. In total, there were some 18 different policy objectives specified, many of which were quite general in application but some of which provided fairly clear direction and related specifically to competition and industrial policy concerns:

a. Efficient telecommunication systems are essential to the sovereignty and integrity of Canada, and telecommunications services and production resources should be developed and administered so as to safeguard, enrich and strengthen the cultural, political, social and economic fabric of Canada ...

b. All Canadians are entitled, subject to technological and economic limitations, to reliable telecommunications services making the best use of all available modes, resources and facilities, taking into account regional and provincial needs and priorities.

c. Telecommunication links within and among all parts of Canada should be strengthened, and Canadian facilities should be used to the greatest extent feasible for the carriage of telecommunications within Canada and between Canada and other countries ...

n. Telecommunications systems and services in Canada, other than broadcasting undertaking ..., should be effectively subject to Canadian control through ownership or regulation.

o. The rates charged by telecommunications carriers for telecommunications facilities and services should be just and reasonable and should not unduly discriminate against any person or group.

p. Innovation and research in all aspects of telecommunication should be promoted in order to improve Canadian telecommunication systems and to strengthen the Canadian industries engaged in the production of broadcast programming and the manufacture of telecommunications systems and equipment.

r. The regulation of all aspects of telecommunications in Canada should be flexible and readily adaptable to cultural and economic change and to scientific and technological advances, and should ensure a proper balance between the interests of the public at large and the legitimate revenue requirements of the telecommunication industy. (emphasis added).

While these various policy objectives are all reasonable and desirable, they are stated at such a general level as to give only a very imprecise and imperfect picture of how the federal government has conducted telecommunications policy and practice. For example, virtually any level of competition within the telecommunications sector and almost any set of industrial policies could be followed within these policy objectives. [Minister of Communications, 1978] In the final analysis, however, the proposed telecommunications legislation failed to get through Parliament after three attempts during the late 1970's and even this most general statement of policy objectives has never become authoritative.

A fourth attempt to define policy objectives for Canadian telecommunications can be identified in the efforts of two advisory bodies - one a consultative committee established by the federal Minister of Communications and the other a working group of federal and provincial officials - both of which operated during the late 1970's and early 1980's. The Consultative Committee on the Implications of Telecommunications for

RECOMMENDATIONS OF THE CLYNE COMMISSION

RELATING TO THE TELECOMMUNICATIONS SECTOR - 1979

Changing the Status of the Cable Industry

Recommendation 1

a) Given that cable companies have been granted territorial service monopolies, they should be regulated on a rate-of-return basis.

b) To this end, action should be taken to amend Bill C-16 for a new Telecommunications Act so as to allow the CRTC to regulate cable companies both as broadcasting receiving undertakings and as telecommunications carriers.

c) For the purposes of implementation of a), the first cable companies to be regulated as telecommunications carriers should be those offering non-broadcast services which they are not now authorized to offer, such as fire and burglar alarm services, Telidon, etc.

d) Cable companies should be allowed to provide non-broadcast services other than telecommunications carriage. When they do so, they should be required to incorporate a separate company for that purpose; if the separate company has the same ownership as the cable company, it should have a separate management and maintain a relationship sufficiently distant to ensure that fair access can be afforded to all competitors who wish to use the cable company's facilities. Under the amended legislation, the cable companies would, in their capacity as telecommunications carriers, be required to offer public access to their services and facilities, without discrimination and at just and reasonable rates.

e) The CRTC should, in preparation for the eventual regulation of cable companies as carriers, institute effective cost-separation procedures by the cable companies, so that the cost of distributing broadcast signals received off-air, as directed by the CRTC, can be identified as one of the costs to be included in the rate base.

The Carriage Industry

Recommendation 2

The pace and extent of plant integration for local delivery of telecommunications services should be determined by future technological, economic and social considerations.

Recommendation 3

The federal government should consider the introduction of amendments to Bill C-27 (for the creation of a Post Office corporation) with a view to clarifying the role of the corporation in the telecommunications structure as a whole, which must continue to include the private telecommunications carriers.

Recommendation 4

In our view the high level of long-distance telephone rates, an outgrowth of the uncoordinated regulatory process in the industry, is a barrier to national communication and understanding. We recommend that the governments and agencies involved cooperate to create a mechanism which will review long distance rates and determine that they reflect national as well as regional interests.

Informatics

Recommendation 22

The federal government should vigorously promote the development of plans for the manufacture and marketing of the Telidon information system and ancillary equipment. This should probably take the form of a joint venture involving major participation by the private sector and investment from both the federal and some provincial governments. It might also suitably involve "chosen instruments" in the manufacture and the commercial development. In following this course the Department of Communications should assume leadership.

Recommendation 23

The federal government, in concert with the governments of the provinces and the private sector, should stimulate forthwith the development of plans for the creation of Canadian-owned private databanks, as well as others funded by governments. Tax and other incentives should be devised for that purpose.

Recommendation 24

The government should act immediately to regulate transborder data flows to ensure that we do not lose control of information vital to the maintenance of national sovereignty. Therefore the government should:

a) Launch a national awareness campaign to explain the social, economic and cultural implications of the new electronic information society. Without a much wider appreciation of the fundamental nature of the changes now taking place it is unlikely that effective mechanisms for considering the issues will be developed, let alone the implementation of appropriate solutions. It should be the responsibility of the Department of Communications to monitor the developments in this area.

b) Require that data processing related to Canadian business operations be performed in Canada except when otherwise authorized.

c) Consider the feasibility of extending the provision in the Bill to revise the Bank Act related to the prohibition of exporting client data for processing and storage abroad. This might be extended, for example, to the insurance and loans industries.

d) Provide greater access to risk capital for Canadian corporations in data processing, to prevent foreign take-overs. Use government procurement more effectively in promoting Canadian enterprises in this area.

e) Promote more effective education and training for high calibre programmers, systems analysts, and others required for developing Canadian systems. The emphasis should be on application development rather than on machine-oriented research and there should be an effort to exchange personnel between government and industry.

The Electronics Manufacturing Industry

Recommendation 25

We recommend that the government:

a) Move quickly and aggressively, in consultation with private industry, to exploit Canada's technological leadership in such areas as Telidon, fibre optics and communication satellites.

b) While recognizing the significant contribution that will continue to be made by small companies in high-technology industries, actively foster the formation of large Canadian-owned firms through mergers and consolidations (as in the case of Spar) in order to achieve production volumes necessary to compete in both domestic and export markets.

c) Revise the combines law to reflect the need to rationalize the industry and to develop large companies.

d) Encourage research and development through very substantially increased tax rebates on all research and development expenditures.

e) Establish an environment of greater certainty for manufacturers by developing design standards that will facilitate adoption of Canadian technology.

f) Recognize the fundamental importance of a secure domestic market base to the development of high-technology industries.

g) Support, on a selective basis, qualified Canadian-owned firms through contracts for both research and development and production.

h) Ensure that foreign technology is imported in a manner that will optimize its exploitation in Canada and abroad by Canadian firms.

i) Be prepared to provide low-cost financing of loans to foreign governments, where necessary to facilitate export sales.

j) Provide tax incentives to encourage the flow of venture capital into high-risk electronics undertakings.

k) Foster the development of an indigenous mini-computer industry.

l) Continue the highly desirable program of technological research at the Communications Research Centre and encourage the diffusion of the results of this research to private industry.

Recommendation 26

We note that in this area there is a serious lack of coordination of government policies and programs. We direct the government's attention, as a matter of urgency, to the reorganization of interdepartmental leadership and the making of decisions in regard to telecommunications.

Canadian Sovereignty, known popularly as the Clyne Committee after its chairman, examined a set of major issues related to telecommunications and, in so doing, treated the matter of appropriate policy objectives in its 1979 report. With regard to increased competition and industrial policy considerations, it essentially came to the conclusion that both objectives could be accomplished. In long-haul transmission and in informatics, the Committee recommended increased competition as one of the proper prescriptions for the problems facing those areas. At the same time, however, it also indicated support for vertical integration and the need for more government involvement in R & D. [Consultative Committee, 1979]

The other advisory body - the Federal-Provincial Working Group on Competition/Industry Structure was established by federal and provincial ministers responsible for communications and submitted reports in 1979 and again in 1981. Its first report outlined five "policy objectives" which largely restated those set out in the proposed federal telecommunications legislation but followed these up with twelve "policy principles" which went a considerable way towards prescribing an appropriate role for increased competition. As a general rule, these twelve "policy principles", which are reproduced on the accompanying page, accord pretty well with the way in which the telecommunications sector has been evolving at least at the federal level in recent years. The matter of industrial policy in this area proved to be a considerably more difficult matter for federal and provincial ministers and their officials to deal with. [Federal-Provincial Working Group, 1979] A separate Working Group on Industrial Impacts of Communications Policies was established to identify and examine such impacts and, in its 1981 report, it set out a series of reasonably precise industrial development objectives for the telecommunications and informatics area as well as several specific

FEDERAL-PROVINCIAL WORKING GROUP ON COMPETITION/INDUSTRY STRUCTURE

IN THE TELECOMMUNICATIONS INDUSTRY

October 1979

Policy Objectives

To satisfy the public interest requirement of the Ministers' resolution, the Group has reached a consensus on a statement of POLICY OBJECTIVES which if satisfied will ensure that the public interest is being served. The statement is as follows:

> Developing and maintaining an efficient telecommunications infrastructure which can provide universal access to a broad range of telecommunications services at economic and equitable rates is a fundamental goal of public policy.
>
> Public Policy also should permit a wide degree of consumer choice and should ensure that services are of high quality and responsive to consumer demands.
>
> Innovation and the efficient use of societal resources should be encouraged.
>
> The development of telecommunications systems and services should contribute to regional development, encourage growth in employment in Canadian industry and enhance its international competitiveness.
>
> Canadian control must be assured and in the areas of ownership, management and technology, Canadian participation should be maximized.

Policy Principles

The Working Group developed the following POLICY PRINCIPLES which would assist in achieving the overall objectives.

1. (a) Standards should be established and maintained to ensure the technical integrity of the telecommunications systems where an interface takes place between the facilities of different entities.

   (b) Quality of service performance standards should be established and maintained when interworking takes place between the facilities of different entities.

2. Regulators should give due regard to the impact of their decisions upon users in other jurisdictions when dealing with matters affecting competition and industry structure.

3. The degree of competition that may be appropriate should be based on a judicious balance between the effectiveness of competition in promoting innovation, efficiency, optimal allocation of resources and the realization of a reasonable degree of consumer choice on the one hand, and on the other hand, the requirements for achieving universality at equitable rates, in the provision of certain telecommunications services.

4. Regulators should ensure that, within their respective jurisdictions, competitive services provided under different regulatory authorities are treated in as similar a manner as possible.

5. Where free entry and exit market competition is not operable or desirable, regulation is necessary.

6. In the case of competitive services provided under regulation, regulators should place reliance on market forces to the greatest extent possible.

7. Canadian participation, consistent with a high level of efficiency, should be maximized.

8. An acceptable measure of cross-subsidization, as may be deemed to be in the public interest within a jurisdiction, is an appropriate means to achieve universality, at equitable rates, in the provision of certain telecommunications services.

9. Users of basic telecommunications services should not bear an undue economic burden as a result of competition in non-basic service offerings.

10. Competitive services should not be cross-subsidized by services provided on a monopoly basis, if this results in unfair competition.

11. Regulated carriers should be permitted to earn a reasonable financial return consistent with the requirement for providing high quality basic telecommunications services.

12. Technical or procedural barriers of an artificial nature should not be used to restrict user choice.

FEDERAL-PROVINCIAL WORKING GROUP ON INDUSTRIAL IMPACTS OF COMMUNICATIONS POLICIES

September 1981

Industrial Development Objectives for Communications Policies

Communications policies have been generally formulated to meet objectives in areas such as economic efficiency, social equity, cultural integrity and national sovereignty; the meeting of industrial objectives was not, and perhaps cannot be, their primary purpose. Because communications policies do have industrial implications, however, it is proposed that industrial objectives should be taken into consideration when existing policies are re-evaluated or new policies are formulated, particularly in the area of new services. The Working Group has focused its attention on industrial objectives at the national level. It recognizes that regional development objectives are also important and should be addressed but decided that this is a major task which would require a specific study of its own.

With this in mind, the following industrial objectives for communications policy are proposed:

> To the extent possible and taking into account general government objectives and priorities, communications policy should strengthen Canadian resources in program production and in the manufacture of communications equipment, and should foster economic development in Canada:
>
> - by promoting research, development and innovation in all aspects of communications;
>
> - by promoting effective Canadian ownership and control of the communications equipment manufacturing and program production industries;
>
> - by contributing to the ability of these Canadian industries to compete with foreign products both in domestic and international markets;

> - by encouraging the development of a favourable investment climate for the Canadian equipment manufacturing and program production industries;
>
> - by promoting the use of Canadian creative and other resources in the production of programming that appeals to both mass and specialized audiences, both in the domestic and export markets;
>
> - by promoting the training and development of the skilled human resources necessary to support a vigorous and competitive equipment manufacturing industry and program production industry;
>
> - by ensuring that regulation takes into consideration not only the interests of the public at large and the providers of communications services, but also the interests of domestic program producers and domestic manufacturers of communications systems and equipment.

Specific Recommendations Re: Communications Equipment Manufacturing

The Working Group recommends that:

1. Pursuant to the establishment of the appropriate mechanisms as recommended above, Ministers should, in their respective areas of jurisdiction and where they feel appropriate, direct regulatory authorities to take into account the industrial implications of any regulatory decision affecting carrier procurement, user ownership and carrier revenues, especially decisions with respect to terminal attachment, vertical integration, new carrier entry and the regulatory treatment of non-regulated activities.

2. Ministers agree that vertical integration in the Canadian telecommunications industry has an important industrial impact; as such, the issue should be considered in relation to communications policy objectives and industrial policy objectives, as well as to general competition policy objectives.

3. Ministers agree that support should be given to the development of those types of switching, transmission and terminal equipment, applications software and computerized databases which offer the greatest opportunities for development and marketing of viable Canadian products and services both at home and abroad.

4. When new services are introduced, Ministers should encourage the effective use of Canadian resources in order to ensure a significant and positive contribution to the growth of the domestic communications manufacturing industry.

5. Ministers agree that government procurement should contribute to the development of the domestic communications manufacturing industry, where applicable and consistent with international trade agreements.

recommendations for applying those objectives to major policy issues. Four such issues - terminal attachment, vertical integration, earth station licensing, and extension of services - were agreed upon as priority issues which could have major effects on industrial development but, on both of these issues, the federal and provincial governments found that they could not come to full agreement among themselves. [Federal-Provincial Working Group, 1981] Nevertheless, the Working Groups' efforts on competition and industrial development continue to represent the most precise specification of policy objectives yet produced in the telecommunications and informatics area.

Finally, the most recent attempt to deal with policy objectives for the telecommunications and informatics area has taken place within the context of the federal government's ongoing telecommunications policy review. The issue of increased competition has been central to that review but industrial policy considerations have been more problematic and illustrative of the rather different approaches taken by the present government and its predecessor. The telecommunications policy review was initiated by the Liberal Minister of Communications in May 1983 when he told the House of Commons Standing Committee on Communications and Culture that he was initiating a review of telecommunications policy, with the aim of "ensuring that it promotes competition in the provision of services and provides opportunities for product innovation in Canadian industry". [Fox, 1983] At first, the review proceeded internally within DOC but, in 1984, government called on submissions from interested parties and, at least tangentially, it also began to involve provincial governments in the process. [Canada Gazette, 1984] With the change of governments in 1984 and the CRTC's interexchange hearing and decision in 1985 dominating the scene,

no clear outcome from that policy review has yet been forthcoming, although there have been indications that a federal government White Paper might be forthcoming this year. [Telemanagement Report, 1985]

With regard to policy objectives for Canadian telecommunications, however, the views of the present Minister of Communications in his first major statement in June 1985 as compared with the former Minister's comments in establishing the telecommunications policy review are revealing of a subtle shift in emphasis. The 1983 statement provided no precise set of principles or priorities for the review but did emphasize that increased competition was viewed as central to the evolution of telecommunications policy.

> The introduction of more competition in the provision of communications products and services will have important implications for the structure of the telecommunications industry. In order to ensure fair competition and prevent hidden subsidies, it may be necessary to require that competitive and non-competitive services be provided by different organizations. Bell has proposed a reorganization along these lines, and it has been approved by the government. It will be necessary to ensure that the public's right to basic telephone service at reasonable rates is not eroded in the process. It must also be recognized that in a country Canada's size, effective competition may be undermined if the market is fragmented among many competing suppliers. Accordingly, any major restructuring of the industry is likely to be marked by shifting alliances and the emergence of new coalitions, rather than by a flood of new entrants.
>
> It will also be necessary to improve the regulatory climate in which the telecommunications industry operates. It is essential that the government acquire the power to set the broad directions of telecommunications policy. While this would remove one of the main sources of confusion currently surrounding the regulatory process, the procedures of the CRTC should be reviewed with the aim of encouraging quicker decisions. Depending on the nature of the structural changes which occur in the telecommunications industry as a result of increasing competition, it may even be possible to dispense with regulation in some service areas. However, in the Canadian context, it is less 'de-regulation' than 're-regulation' which is the order

> of the day. Emphasis must be placed on making the regulatory process work more efficiently and not on eliminating public oversight. Important social questions are invariably at stake in major regulatory decisions.

Increased competition, then, was portrayed primarily in industrial policy terms and expected to lead to important changes in the structure of the industry involving the separation of competitive from monopoly markets and corporate realignment, changes in the role of regulation though more in the form of "re-regulation" rather than American-style deregulation, and new initiatives to support leading-edge technologies, innovative firms, and expanded uses for telecommunications and informatics. [Fox, 1983]

In his first major statement on telecommunications in June 1985, the present Minister went further in identifying "four principles", with implicit priority given to each, as a guide for the telecommunications policy review:

> First and foremost, we must develop a policy which preserves universal access to the telecommunications system at affordable prices. Canadian telephone service to individuals and households is among the very best in the world. No policy, no matter what its industrial or economic benefits, can be considered acceptable if it lowers the current level of service, which is so essential to so many Canadian citizens. Similarly, no policy can be considered acceptable if it means that this essential service will not continue to be universally affordable.
>
> Our second principle will be to ensure that our telecommunications sector remains at the forefront of technological progress and benefits all Canadians. Our industry is, in many respects, a world leader, and a legitimate source of pride for all Canadians. We must not allow this to erode in the face of technological changes. We must meet the challenges of technology, and we must do so in a way which does not merely concentrate the benefits in the hands of a few. Progress in our telecommunications sector can, and will, be of benefit to all of Canada.
>
> Third, we will be guided by a principle of maintaining our international competitiveness -- not just the competitiveness of our telecommunications sector, but

> also, through it, the competitiveness of Canadian industry in general. Telecommunications is an increasingly important component of our economy. In keeping with our policies in other areas, the telecommunications policy of this government will maintain an international perspective, and will consider Canada's position in the global marketplace.
>
> And, finally, our fourth principle will be that, as in so many areas, Canadian telecommunications presents uniquely Canadian challenges, and therefore we must find uniquely Canadian answers. Our climate, our geography, our dispersed population, and indeed our federal system, with its distribution of powers and responsibilities - all these have to be addressed. We may benefit from examining the experiences of other countries, but that is all. Our Canadian problems demand Canadian solutions. [Masse, 1985]

When the telecommunications policy review was first conceived in 1983, its frame of reference was defined very much in terms of increased competition and its relationship to industrial policy considerations. In its more recent formulation, however, an important consumer dimension has been added as well as a greater emphasis on international competitiveness.

What this review of objectives for telecommunications policy has attempted to do is to show how competition and industrial policy considerations weave their way through federal government thinking during the 1970's and 1980's. One must conclude, however, that there has not yet been a conclusive and specific statement of those objectives nor any precise priority established for competition and industrial policy among the whole range of policy objectives in the telecommunications and informatics area. The Task Force on Computer Communications and its recommendations provide a most interesting starting point, the proposed telecommunications legislation of the 1970's was a "first cut" at setting out policy objectives at a general level, the federal-provincial working groups came up with the most elaborate specification of these two objectives, and the Minister of Communication's 1985 statement is

instructive as to shifting priorities. Nevertheless, no clear set of policy objectives and their relative priority can be said presently to exist at the federal level which could give guidance to the private sector, provincial governments, the public at large, or the rest of the federal government. It is to be hoped that, as a result of the telecommunications policy review, DOC will find it possible, in consultation to set down policy objectives in some reasonably specific form as a first step towards greater coherence and certainty in telecommunications policy.

In our view, a degree of increased competition in telecommunications and informatics must be accepted as inevitable and beneficial and only the excesses and abnormalities of increased competition in the Canadian context - unfair manipulation of the regulatory process, unproductive bypass activities, foreign competition which is not reciprocal, multinational corporations which do not contribute their fair share to domestic R & D and manufacturing, or special circumstances where competition is not appropriate. At the same time, government should also take a hard-headed approach to industrial policy and its role in the telecommunications and informatics area, recognizing that industrial policy concerns are a legitimate and important part of telecommunications policy, that they are not inconsistent or incompatible with increased competition, and that telecommunications policy must be related more effectively to the wide range of other government policies and programs. The setting of clear policy objectives, then, should be regarded as one essential outcome of the telecommunications policy review.

Organizational Matters. Whatever specific policy objectives eventually emerge from the telecommunications policy review and even if specific policy objectives are sacrificed in an effort to move directly towards deliberate action, there still will remain the issue of whether or

not the federal government is adequately and effectively organized to formulate and deliver policy in the telecommunications and informatics area. When first created, the Minister of Communications and his emerging department were given a nuts-and-bolts mandate to exercise federal jurisdiction with regard to "telecommunications" and "the development and utilization generally of communication undertakings, facilities, systems and services for Canada" including such duties as to:

> (a) coordinate, promote and recommend national policies and programs with respect to communication services for Canada, including the Canada Post Office;
>
> (b) promote the establishment, development and efficiency of communication systems and facilities for Canada;
>
> (c) assist Canadian communications systems and facilities to adjust to changing domestic and international conditions;
>
> (d) plan and coordinate telecommunication services for departments, branches and agencies of the Government of Canada;
>
> (e) compile and keep up to date detailed information in respect of communication systems and facilities and of trends and developments in Canada and abroad relating to communication matters; and
>
> (f) take such action as may be necessary to secure, by international regulation or otherwise, the rights of Canada in communication matters. [DOC, 1968-69]

While there have been several additions, modifications, and deletions to the Department's responsibilities such as oversight of corporate entities like Teleglobe and Telesat, appeals arising out of CRTC decisions, the abrogation of responsibility for the Post Office, the addition of responsibilities in the area of broadcasting and arts and culture, and the recent policy directive power vis-a-vis the CRTC, the mandate of DOC has remained fundamentally unchanged since the late 1960's. [DOC Annual Reports]

How DOC has organized itself to carry out that mandate, however, has changed considerably over the years. When it was first established, it brought together four pre-existing governmental involvements in the communications area: management of the radio frequency spectrum, a research and development capability in several areas of communications, an emerging satellite communications program, and the government's own telecommunications service facility. Each of these involvements were absorbed in recognizable form within the new Department and all have grown and prospered to differing degrees as they responded often quite separately to the problems and opportunities which each confronted. Functional units were soon created within the Department to deal with such matters as federal-provincial relations, Canada's involvement in international communications affairs, and policy and planning activities. These functional units, however, have always been relatively small and loosely integrated into the varied activities of DOC even though they are essential to the carrying out of overall departmental responsibilities. New or reorganized components were established within DOC at different times to exercise enhanced responsibilities for broadcasting after 1976, for arts and culture after 1980, and most recently for the Department's information technology programs. And finally, of course, DOC also contains the normal financial management, personnel, communications and data processing support which all reasonably-sized organizations require in order to operate. Over the course of this normal process of growth and development, it is quite possible for organizations to change. [DOC Annual Reports] Departments sometimes outgrow their original mandate, the goals they originally strive for come to be displaced, they may not be able to organize themselves effectively internally, or they may not be able to establish and follow clear policy objectives within their areas of responsibility. As we have

suggested earlier, DOC does appear to have had considerable difficulty over the years in effectively articulating clear policy objectives for Canadian telecommunications and, in our view, this has been at least partly a consequence of organizational difficulties relating to the role of DOC, its approach to policy-making, its internal structure, and its interface with other players within the telecommunications and informatics area.

With regard to the role of DOC as distinct from its mandate, the Department has not been able clearly to establish itself as the "Focal Point" within government for telecommunications and informatics issues. To be sure, it is recognized and respected as the federal department with primary responsibility and acknowledged expertise in this area but by no means the only department or agency with views and interests on matters of telecommunications and informatics. DRIE, External Affairs, MOSST and a number of other departments and agencies all are involved in the area. In part, this pluralism is a reflection of the spread of telecommunications into computers and other areas of the "information business" and it would certainly be unreasonable to expect that a single government department or agency - especially in a country like Canada - could speak for the whole of this area. In part, however, this inability on the part of DOC to emerge as the "Focal Point" within government is the result of approaches to policy-making which, with the benefit of hindsight, have been too incremental in nature, too sectoral in application, not sufficiently outward oriented in terms of consensus formation, and not always effective in terms of an appropriate policy process.

This blanket criticism of DOC's approach to policy-making requires explanation and elaboration. With regard to the emphasis on incremental change, it is certainly true that DOC should not be expected, nor would it

be desirable for it, to play a comprehensive planning role vis-a-vis an economic entity of the size and complexity that the "information business" has become. However, it is reasonable that the Department have a strong "strategic planning" capability which allows it to respond in small steps but logically and speedily to changing structural conditions and shifting trends. In addition, DOC has tended in the past to act too often like a typical "line" department with a sectoral interpretation of its mandate and a program-based organization rather than choosing to assert its "Focal Point" role. DOC is not primarily a program delivery department, except in certain areas like arts and culture, and it would certainly be wrong to see it in this way in the area of telecommunications and informatics; instead, it should be viewed as a policy and research department whose influence should be specifically measured in terms of the creation of a stable yet innovative policy environment. Things have been moving more in this direction as reflected in DOC's most recent reorganization in 1983/84 and in the expected outcome of the Department's telecommunications policy review. Concerning consensus information, DOC has not in the past been outward-oriented enough in dealing with other federal departments and agencies, provincial governments and the private sector and attempting to bring these elements into any consensus which it is trying to build for policy change. In our interviews with other departments and agencies and with many industry people, we occasionally heard that DOC tended to "play their cards close to the vest" and some felt that it did not make adequate use of available outside resources in supporting their policy positions. Finally, with regard to an appropriate policy process, DOC seems not always to have paid much attention to the procedural aspects of how policy can best be formulated and how various interested parties can be involved in the process at the proper time. While the Department adheres to the normal

procedures for policy development such as gazette notices, consultation and the like, these may not be fully adequate. The telecommunications policy review may well be a case in point with the genesis of the review coming in the Minister's speech and well before the Department was ready to proceed and more recent leaks about the existence of a "game plan" for how increased competition could be introduced most expediently. [Canadian Communications News, 1985] Intimations of a hidden agenda, whether or not they are true, do not contribute to effective policy-making.

If DOC has not really been able to emerge clearly as that "Focal Point" within government and society, what role can it reasonably play within the telecommunications and informatics area? Many observers would suggest that its role lies in three areas: planning, coordination, and stimulation. Strategic planning relates the organization to its environment and DOC has a clear role to play in monitoring and assessing developments in the technological and industrial area and relating them to policy. Coordination is another important role for DOC and there is lots of scope for such activity given the diversity of departments and agencies involved at the federal level, federal-provincial and international relations, and government-industry relations. Finally, DOC has an important role to play in stimulating the use of telecommunications and informatics in Canada through its own research, technology transfer activities, selective industrial support, etc. Despite its inability to emerge clearly as the "Focal Point" for environmental or policy reasons, there is no question that DOC can and does play a crucial role in the telecommunications and informatics area.

Specifically with regard to increased competition and industrial policy considerations, DOC appears much better organized to deal with these

issues after the 1983/84 reorganization than before it. Prior to the reorganization, departmental organization had a distinctly sectoral look to it with separate sectors dealing with spectrum management, space, telecommunications and broadcasting. Within the National Telecommunications Branch, policy and industry structure activities were mixed together and many of the informatics activities were handled under the research program. The 1983/84 reorganization provided for a clearer separation of functions within the Department as well as an upgrading of some elements within the Department. The Telecommunications Policy Branch, which is responsible for advice on competition as well as the broad spectrum of other issues facing Canadian telecommunications, is now part of the Telecommunications and Informatics Sector and separated from other policy-related functions like strategy and plans, federal-provincial relations and international relations. The Industry and Economic Development Branch, which monitors and assesses developments in telecommunications and informatics, is now also part of the new Telecommunications and Informatics Sector. At least some of the criticisms directed at DOC's previous organizational structure - both internally and from outside - have been addressed and the Department appears to be better organized to handle issues like the IC/IP problem.

Finally, there is the matter of DOC's interaction with other federal departments and agencies, the provincial governments, and the private sector. As noted before, DOC appears as something of an "enigma" to other players within the telecommunications and informatics area. These other players claim that they don't always know where DOC stands on important issues and they wonder why the Department doesn't exercise its planning and coordination functions in a more collaborative manner. Several other federal departments and agencies were critical of the Department for not

having clearly articulated a position on competition within the telecommunications sector and for treading on their territory especially when it moves into the industrial policy sphere. We have not talked to officials responsible for telecommunications at the provincial level during the course of this project but our interviews for previous work indicated a similar concern about how DOC exercises federal responsibilities in the area, particularly with respect to what some provincial officials regard as a frustratingly hidden commitment to competition and, on occasion, a failure to curb the often quite independent role of the CRTC. Views on the relationship between DOC and the private sector are more mixed. We have heard it suggested more than once that Northern Telecom has "outgrown" the ability of DOC and the federal government easily to influence its behavior, that foreign multinationals in the informatics area suffer from a kind of "benign neglect" on the part of DOC, and that medium- and smaller-sized Canadian firms feel that DOC is sometimes half-hearted and inconsistent in its support for the industry. Clearly, DOC has something of an "image problem" in dealing with other players on the IC/IP problem. What this suggests is the need for DOC and the federal government to reassess its interaction with these players. Perhaps a more deliberate organizational strategy is necessary so as to allow DOC to interact more formally with other actors, one which would involve an explicit interdepartmental committee forum or even some form of industry - government - labour council in addition to the federal-provincial consultation process which is already in place. [Valaskakis and Sindell, 1980] In summary, then, DOC has not emerged as the "Focal Point" in the telecommunications and informatics area that many hoped it would but it has no choice but to play a leading role and better organize itself to carry out its mandate.

Operational Principles. Our analysis to date would suggest a number of operational principles which the federal government might wish to adopt in formulating and implementing telecommunications policy and in dealing with the IC/IP problem. These operational principles relate to how policy objectives in the telecommunications and information area might be harnessed to organizational realities. It is quite clear that DOC and the government as a whole want telecommunications policy in Canada to sanction increased competition primarily for reasons of economic efficiency and national competitiveness but at the same time to retain and even enhance its industrial policy relevance. In the same way that DOC wishes to pursue "re-regulation", it also wants to pursue "re-industrialization" within the telecommunications and informatics area. However, the precise specification of telecommunications policy objectives and the priority to be given to competition and industrial policy considerations remains unclear and, in any case, the pluralism of responsibilities and interests within the telecommunications and informatics area makes policy formation difficult. Given the fact that there is as yet no authoritative statement of telecommunications policy to which we can react, perhaps it might be useful to explore some operational principles which DOC and the federal government might keep in mind in pursuing its present review process.

First of all, recognize that it is not possible to establish a telecommunications policy for Canada on your own. The complexity of the task is considerable when one takes into account the range of technological, economic, social, and political factors which should be considered. As well, jurisdictional difficulties and international considerations must be factored into the equation. Furthermore, as DOC no doubt understands, there are simply too many views and interests out there for any technocratic solutions to be acceptable. What DOC should do is set

out its policy objectives for Canadian telecommunications as precisely as possible and invite the reaction to particular policy objectives which will surely come from interested parties and the public at large.

Second, any telecommunications policy which emerges will have to accord with the government's pervasive "hands off" philosophy. The power of the "hands off" philosophy within government at the present time is considerable. The benefits of competition, regulatory reform privatization, cost-based pricing, etc. are clearly on the ascendent and must be given their due. This does not mean, however, that industrial policy must necessarily be sacrificed. There is the potential for an industrial policy that involves less government intervention. One form of regulation may well be replaced by another, tax incentives can sometimes be utilized just as easily as subsidy programs, and the argument for continuing vertical integration might be made just as well on nationalist grounds as in terms of "natural monopoly".

Third, emphasize the process associated with telecommunications policy as well as its substance. Process in policy formation and implementation is highly important. Giving other departments an opportunity to contribute to the way in which policy is established will pay dividends later. Apprising provincial governments of what policy is forthcoming is a necessary feature of how our federal system should work. Giving industry an opportunity to register their views and interests makes it easier for them to accommodate themselves to whatever "rules of the game" eventually are established. And finally, placing your strongest arguments before the public - even when unpalatable policy initiatives are involved - cannot help but contribute to the legitimacy of the policy as a whole. It is encouraging that process considerations are now receiving greater attention

within DOC.

Fourth, remember that telecommunications policy especially as it relates to competition and industrial policy concerns overlaps with a number of other government policies and programs. To be effective, telecommunications policy should learn from and be synchronized to the evolving experience of those other policy areas. In many ways, the relationship between increased competition and industrial policy become clearest when one looks not at the internal consistency of telecommunications policy but at the interaction of telecommunications policy with other government policies and programs. And it is to this subject that we now turn.

4.2 The Interaction of Telecommunications Policy With Other Government Policies and Programs

During the course of our research and interviews, we became acutely aware of the interaction between telecommunications policy and other government policies and programs. A significant part of our research focused on identifying those policy areas where the degree of overlap was substantial and exploring how competition and industrial policy considerations bear upon government policy and programs in those areas. As well, we explored the interaction of telecommunications policy with trade policy, employment policy, R & D policy or foreign investment policy at one time or another in virtually all of our interviews with government and industry people. In some cases, there is a clear body of evidence and opinion on the interaction of telecommunication policy with these other government policies and programs but in other cases there are considerable gaps in our knowledge and understanding. One general theme did emerge from this exercise, however, and that is the way in which "framework" policies are becoming more and more prominent while "sectoral" policies are clearly

in disfavour. Specifically with regard to the IC/IP problem, this means that it is increasingly difficult to maintain many of the elements of that implicit set of industrial policies which have predominated within telecommunications policy, except if they can be justified on other grounds or redefined in different terms.

Competition Policy. The IC/IP problem arises most directly and explicitly on the interface between competition policy and telecommunications policy. Competition policy in Canada - however ineffective the legislation may have been in practice over the years - is supposed to nurture and sustain as much competition as possible within the domestic economy, except in those cases such as "natural monopoly" or "destructive competition" where other industrial structures are justifiable. [Gorecki and Stanbury, 1983; Cairns, 1980] Telecommunications in Canada may at one time have qualified as one of these exceptional cases but substantial evidence has been mounting that special status is no longer warranted. Increased competition is becoming increasingly evident in the Canadian telecommunications sector - in most of the specialized services areas, at least in the interconnect market and perhaps more extensively in the equipment sector, and even in the facilities area with regard to long-haul transmission. For the most part, however, its development has taken place not as a consequence of a vigorous competition policy but rather for technological reasons or as a result of gradual changes in regulatory practice. As well, there still remain fundamental aspects of telecommunications policy which conflict with competition policy objectives. The prime example in this regard is vertical integration and any thorough-going attempt to mesh telecommunications policy with competition policy will have to confront this issue. More broadly, if

competition policy is to be linked more closely to telecommunications policy, it will be primarily through what the Macdonald Commission identified as the two most important means of promoting increased competition in a small economy like Canada, i.e changes in regulatory practice and trade liberalization. [Royal Commission, 1985]

Strictly from a competition policy standpoint, the case against vertical integration is strong. [Globerman, 1980; Babe 1981] As was argued most forcefully by the Bureau of Competition Policy before the Restrictive Trade Practices Commission in the middle and late 1970's, vertical integration such as the Bell Canada - Northern Telecom relationship preempts the development of a competitive domestic supply market, inhibits effective foreign competition, and can lead to higher user rates than would otherwise be necessary. Divestiture of Northern Telecom on the part of Bell Canada was the original remedy proposed but a less drastic solution - competitive bidding practices - was later suggested as a minimal compromise. On the other side of the issue, DOC, Bell Canada, Northern Telecom and others continue to maintain that vertical integration does not lead to higher rates than would result from competitive supply arrangements and that its continuation is necessary within a world telecommunications market where preferential arrangements are commonplace. The central issue which emerged from this argumentation is whether Northern Telecom could have achieved its considerable success in export markets if it had not enjoyed guaranteed access for its products to the substantial Bell Canada market. In its judgment, the RTPC basically found that vertical integration did not impose excessive costs on domestic users of telecommunications services, although it did recommend that the CRTC apply comparative pricing standards in assessing Bell Canada rate requests. As well, the RTPC provided considerable evidence to sustain the notion that

vertical integration was probably instrumental - though not the only factor - in explaining Northern Telecom's export success. [Restrictive Trade Practices Commission, 1983]

On a substantive level, the vertical integration issue has not progressed much beyond this point in subsequent years. Both sides to the issue continue to disagree while vertical integration continues essentially undisturbed. There is evidence that vertical integration remains a controversial feature of telecommunications policy in Canada. Changes in domestic regulatory practice in Canada are spawning increased competition within the telecommunications sector and these new competitors - supported increasingly by user groups - will continue to press for an end to vertical integration. Recent federal government initiatives in the direction of regulatory reform portend not only a streamlining of procedures but also extensive "re-regulation" of industries like telecommunications which would encourage greater reliance on competition. [Privy Council Office, 1985] Likewise, vertical integration will undoubtedly become a significant issue in trade negotiations with the United States where potential foreign competitors in the Canadian market will seek to place this issue on the table and make Canada reconsider and retract this longstanding element of its telecommunications policy as part of the price it must pay for a free trade pact. [Exchange of Correspondence, 1985] There is no indication that DOC has changed its thinking on the essential nature of vertical integration but there certainly are other forces within the federal government who would not be unwilling to do away with vertical integration either for reasons of regulatory reform or as a part of trade liberalization. In fact, the way in which competition policy objectives and trade policy objectives are increasingly compatible and reinforce each

other has recently been noted, particularly in the context of increasing internationalization of markets. [Hunter, 1985]

At a more general level, competition policy as a "framework" policy conflicts with "sectoral" strategies such as have in the past been pursued implicitly in the telecommunications sector. The logic behind "framework" policies is horizontal and non-interventionist while sectoral strategies have tended to be vertical and interventionist. One specific area where the two come into conflict is over the issue of "targeting" for industrial policy purposes. While "targeting" has not been all that prominent or successful in the telecommunications sector, the bias within competition policy would be against such a technique because it is inherently anti-competitive. Another area of conflict is with regard to limitations on foreign access to the domestic telecommunications market. From the competition policy perspective, foreign competition should actually be encouraged because, even more than domestic competition, it is likely to push prices lower. In this regard, for example, the status of competition within the informatics sector - despite the high degree of foreign ownership and the trade deficit - is stronger and to be preferred as compared to what is present in the telecommunications sector. [Carstenson, 1981] In short, linking telecommunications policy more closely to competition policy would require major changes in the implicit industrial policy which government has until now been pursuing in the telecommunications sector in Canada and such a radical reorientation does not seem likely.

Trade Policy. Trade policy is widely viewed as the single most important policy area where government action - or the lack thereof - can mediate increased competition and affect industrial policy in the telecommunications sector both in the short term and in the longer term.

It is the "wild card in the deck" which can change the value of the cards which each of the players hold. Trade policy relating to Canadian telecommunications has always been an essential part of the implicit industrial policy which Canada has pursued - both in terms of exploitation of export markets and limitation of foreign access - and ties right in with pressures for increased competition within the domestic market. [DOC, 1979] The telecommunications sector is looked to as a notable bright spot in Canada's manufacturing trade with the U.S. and the rest of the world, something which definitely cannot be said about the informatics sector. Telecommunications as a trade issue arises initially in a narrow sectoral context but is also part and parcel of broader conceptualizations like high technology trade and even more broadly as "trade in services". [MOSST, 1985; DEA, 1984; Interdepartmental Task Force, 1982] Specifically at the present time, telecommunications is centrally important to the upcoming multilateral GATT negotiations and also to the ongoing bilateral trade negotiations with the United States. However, no clear view or firm position seems yet to have crystallized within government on where Canada's real interests lie on the matter of telecommunications as a trade issue nor on the appropriate relationship between telecommunications policy and trade policy.

The link between telecommunications policy and trade policy has long been present but it has until now been largely an inferential one. Regulated monopoly conditions and vertical integration have combined to severely restrict competition within the domestic telecommunications market and it has only been since the 1970's that Canadian equipment manufacturers and, to a much lesser extent, the common carriers have found it appealing to compete in foreign markets. In this regard, Canadian telecommunications

has been part of the classic pattern of import substitution which has characterized so much of Canadian manufacturing history. [Williams, 1983] Tariff and non-tariff barriers have not only effectively protected much of the Canadian market but have also limited the potential for trade within the world telecommunications market. As we have suggested, however, the world telecommunications market - especially the U.S. market, increasingly the British and Japanese markets, and even Third World markets - is opening up and creating opportunities which firms like Northern Telecom and Mitel are busy exploiting. [DOC, 1983] For Canada, telecommunications trade has been increasing substantially since the mide-1970's and since 1979, the country has been running consistent positive trade balances in this area which offset in part the negative trade balances in computer and office equipment and other areas of manufacturing trade.

However, changing trade fortunes should not be allowed to obscure or detract from basic structural factors both among and within the telecommunications and informatics sectors. With regard to industrial policy, telecommunications policy and trade policy have been implicitly linked both with regard to limitations on access to the domestic market and efforts to promote Canadian firms attempting to exploit foreign markets. Vertical integration, tariff barriers and various non-tariff barriers have operated in the past to limit access to the domestic markets but all of these factors are presently "on the table" in multilateral and bilateral trade negotiations. Likewise, promotion, market development and export financing are all receiving increased attention as Canadian companies are encouraged to compete more aggressively in foreign markets. The implicit "carrot and stick" features of industrial policy with regard to Canadian telecommunications are changing - the carrot dangling in front of Canadian firms is bigger and more juicy while the stick deterring foreign

competition looks less menacing and provides less protection.

Canada's trade strategy as it might affect the telecommunications sector has not yet been expressly stated and contains more than the normal degree of uncertainty and ambiguity which must necessarily envelope a country's trade objectives and negotiating posture. For both the bilateral and multilateral negotiations, no explicit policy statements have been made which go much beyond the basic commitment to "competitiveness and security" which the present government has articulated as the twin cornerstone of its foreign policy. [DEA, 1985] However, the trade policy document and background paper which the previous government set out in 1983 probably accords reasonably well with the basic starting point of the present government. That document presented "competitiveness" which it chose to define as "the immediate and future ability of industrialists to design, produce and market goods whose price and non-price qualities form a more attractive package than those of competitors abroad or in domestic markets" as the main goal; as well, it presented the creation and maintenance of jobs through increased exports as the major benefit to be realized. [DEA, 1983] Both telecommunications manufacturing and services were identified as the kind of "high tech" area where Canada could maintain or develop "world-class" capabilities. However, the place of telecommunications or other high tech industries within Canada's overall economic development strategy is problematic. The most influential statement of federal government policy in 1981 ranked a "high tech" manufacturing strategy well behind natural resource development in terms of national priorities for economic growth and development and there is little evidence that this resolution of the trade-off - so traditional and characteristic of Canada - has changed significantly in subsequent years except to reflect changing

market conditions. [Government of Canada, 1981] Thus, trade in "high tech" manufactured goods and associated services, of which telecommunications trade is one important though declining element, can realistically be regarded as only a moderate priority for government in the 1980's.

One major issue of controversy within trade policy relates to how broadly telecommunications trade should be interpreted and what this implies for Canada's evolving trade strategy. The conventional view of telecommunications trade would limit it to exports and imports of telecommunications equipment, including both network and terminal equipment, and this is distinguished from trade in computers and components where Canada's trade performance has been weak. In this conceptualization which is essentially the current orientation, promotion of telecommunications trade would be linked to the export activities of Canadian firms operating in "niche" computer markets as well as foreign multinationals in Canada with world product mandates to mount a sustained export effort. [DEA, 1983] A broader orientation to trade would focus on telecommunications and computer services in addition to equipment exports. While Canada's trade in telecommunications and computer services is minor at the present time, this could increase as a result of the evolution of new networks, more attention to software, and international experience in professional and consulting services. Greater emphasis on the services side - in addition to the equipment side - would accord with a view of emerging technological and market developments as foreshadowing the new reality of international competition among a variety of information networks and where Canada will have to clarify its self-interest and carve out its place especially vis-a-vis the United States. [DEA, 1984] Yet a third rendering of the importance of telecommunications trade would see it as but one element among many within the concept of "trade in services".

This concept is broader in conception than the competition of networks outlined above, relating not only to telecommunications and computer services but also to financial services, health services, cultural services, etc. and highlighting the extent to which these services routinely cross international borders but remain largely outside the existing trade system. [Interdepartmental Task Force, 1982; Robinson, 1985] As both a bilateral issue with the United States as well as multilaterally with all the world, Canada has important interests - particularly with regard to access vis-a-vis free flow - which may not always coincide with those of her southern neighbour.

On the multilateral level, Canada is presently developing its position for the upcoming GATT negotiations to begin later this year and the link between telecommunications policy and trade policy is evident at several points. Among the possible agenda items where the two policy areas interact are such issues as non-tariff barriers, government procurement, and "trade in services". Non-tariff barriers - what has come to be referred to as "the new protectionism" - have serious implications for telecommunications trade and take a variety of different forms, including industry support measures, domestic legal and regulatory restrictions, technical standards, and contingency measures, among others. Canada, along with every other country, is on both sides of this issue, decrying non-tariff barriers when they affect its ability to trade but also unwilling to do away with specific domestic programs to which other countries object. On balance, however, Canada probably has more to gain than most countries from genuine and reciprocal efforts to reduce non-tariff barriers particularly vis-a-vis the European PTT-nations and especially as they bear upon an area like telecommunications and informatics where the world market

is growing dramatically. [Quinn and Slayton, 1982; MOSST, 1985] Government procurement is another area where Canada has much to gain and relatively little to lose. Much of the Canadian telecommunications system rests in private rather than in public hands and, even if modifications in vertical integration were agreed to as part of an overall package, the domestic supply market would probably remain more or less unaffected. However, changes in government procurement practices among PTT-nations, as has been happening in Great Britain and Japan and which would be most welcome elsewhere in Europe, would allow Canadian firms to compete through joint-venture and other arrangements in markets where they cannot do so today. [Quinn and Slayton, 1982; Whalley, 1985] And finally, the "trade in services" issue poses particular difficulties for Canada in its multilateral dealings. It is clearly in Canada's interest, in general, to promote trade in telecommunications and computer services and, in this regard, it shares a community of interest with the United States vis-a-vis many European and Third World nations. On the other hand, Canada cannot benefit from increased trade in this area unless a proper trading regime is established which goes beyond "free flow of information" principles to recognize the legitimate concern and authority of nations to govern access to their networks in accord with good trading practice and their own self-interest. [Robinson, 1985; Grey, 1985] On each of these multilateral issues in trade policy, Canada has direct interests and clear objectives relevant to telecommunications where, in the longer term, the GATT negotiations may well prove to be more important than bilateral trade negotiations with the United States.

Nevertheless, free trade with the United States and its implications for telecommunications policy must command the most attention at the present time. Many voices - the Economic Council, Senate Committee on

Foreign Affairs, the Macdonald Royal Commission, numerous business groups, prominent academic figures and, now since 1985, the federal government - are all in favour of some form of free trade arrangement with the United States. [DEA, 1985] The general arguments for freer trade are numerous and persuasive, including such matters as increased economic efficiency, lower cost products within Canada, open access to a market ten times our size, and greater security for Canada in an unstable world trade environment. However, serious studies of the impact of freer trade on the Canadian telecommunications sector as one of a host of industrial and non-industrial sectors have not yet been released so that the precise implications of such action are not always readily apparent. Our interviews with government and industry officials - and particularly the latter - have demonstrated broad support for freer trade as it might affect the telecommunications sector and virtually no one was prepared to come out squarely in opposition to it. However, there were a number of nagging doubts and serious concerns expressed about the possible implications of freer trade for Canadian telecommunications which should be confronted directly. A preliminary and largely skeptical assessment of the costs and benefits of moving towards freer trade in the telecommunications sector is provided separately. [DEA, 1984; MOSST, 1985; Harris, 1985] While probably not enough to derail a broad free trade agreement with the United States, this skeptical assessment should provide food for thought in terms of any Canadian negotiating strategy and the future of telecommunications policy. At the very least, it should alert government to the need for more serious and hard-headed sectoral studies and the widest possible consultation before, during and after a trade agreement has been negotiated.

Employment Policy. The impact on employment has thus far been a minor

A SKEPTICAL ASSESSMENT OF THE COSTS AND BENEFITS OF FREER TRADE

WITH THE UNITED STATES IN THE TELECOMMUNICATIONS SECTOR

* The present tariff situation between Canada and the United States with regard to telecommunications sector may well be near optimal from the Canadian standpoint. The 17.5% tariff on imports vis-a-vis a 4% tariff on exports allows Canada to protect its domestic market while facing a relatively low tariff barrier into the United States and this has operated in virtually the classic manner to allow Canada to build its telecommunications capability. By way of comparison, tariff rates between the two countries affecting much of the computer industry have been essentailly neutral and no broad Canadian capability, except for "niche" manufacturing and services, has emerged.

* Non-tariff barriers to telecommunications trade with the United States are not all that important especially for the larger Canadian companies and in comparison to other countries. Protectionist legislation pending in Congress such as the Danforth Bill pose a potential threat to the Canadian telecommunications sector but it is not clear that such legislation could pass through Congress; "Buy America" provisions do limit procurement especially at the federal and state level but this market is a limited one vis-a-vis the BOC's and OCC's; legal and regulatory restrictions on foreign access to the American market have been significantly lowered and those which remain such as immigration restrictions on transborder professionals are minor irritants; and so-called "contingency measures" provided for in U.S. legislation have not yet been invoked to provide import relief to domestic American companies.

* The most difficult non-tariff barrier to assess is "national security". National security considerations do limit access to the substantial U.S. defence telecommunications market but the actual scope and extent of these limitations are difficult to determine. Many defence contracts are routinely classified as "NONFORN" (no foreign firms need apply) while other top secret strategic contracts are simply not publicly tendered. Larger Canadian companies like Northern Telecom and especially those which have gone multinational may be able to get around "NONFORN" designations but this is not the case for smaller Canadian firms. As well, the Defence Production Sharing Program can be utilized in some cases to allow Canadian firms to gain defence telecommunications contracts. On balance, however, national security must be regarded as a significant non-tariff barrier into the U.S. market and also one which is unlikely to be placed "on the table" in bilateral trade negotiations.

* With the growing emphasis on services as well as equipment, the relevant terms of reference for trade negotiations is changing. It is not appropriate to regard telecommunications trade as a matter of importing and exporting commodities or even as a matter of "trade in services". Rather, telecommunications trade should be viewed as a competition for and among networks where the prize is to put American and Canadian telecommunications networks into competition with each other. Under present conditions and despite the high quality of Canadian telecommunications networks, long distance competition in the United States and greater movement towards cost-based pricing make American networks more competitive vis-a-vis Canadian networks and increased competition among networks would almost inevitably require similar changes in telecommunications policy in Canada.

* Freer trade with the United States would also likely affect industrial structure in the Canadian telecommunications sector. Whatever its merits or demerits, vertical integration would become more difficult to justify as the U.S. government and American competitors press for a clear "divestiture" of Northern Telecom from Bell Canada. It should be noted however, that the U.S. telecommunications market continues to be characterized by a substantial degree of vertical integration. Likewise, it would also undermine the need for multinational enterprise structures both in Canada and the United States since it would no longer be necessary to establish subsidiaries in Canada to get around high tariff walls nor would there be a similar need for Canadian firms to go multinational in order to gain access to the U.S. market. The logic of freer trade is continental industrial organization with all of its attendant threats to the economic and political status quo.

* Finally, freer trade between Canada and the United States in the telecommunications sector would not only have direct effects on telecommunications policy and practice in Canada as indicated above but also "ripple" effects on other policy areas which interface with telecommunications policy. The employment impact of freer trade in the telecommunications sector, the continuation of R & D support as part of industrial development and regional development programs, the continued logic of foreign investment review, the ability to use procurement as an instrument, among others would all become problematic. Thus, the impact and implications of a Canada-U.S. free trade arrangement for Canadian telecommunications are extensive and may not be as beneficial as most government and industry players presume.

chord among the various factors bearing upon telecommunications policy but one which could become more prominent in the years to come. A major debate has been going on about how technological change and particularly the "high tech" industries contribute or don't contribute as much as they might to aggregate employment growth. On the more general level, the various studies available to date suggest a stubborn pessimism about the overall impact of telecommunications and informatics technology on employment, given their "displacement" effects and patterns of adoption and diffusion among and within various industries, but they do not suggest that some uniform technological determinism is at work. More specifically, employment among telecommunications carriers and manufacturers may have reached a stable level and cannot be expected to grow much in the next few years but employment prospects in the informatics area and especially with regard to telecommunications and computer services are considerably greater. As well, the overall impact of telecommunications and informatics on the national economy and a wide range of industries are probably modestly positive in the longer term, however much it may be disruptive in the shorter term. At the same time, government must also keep in mind the well-known tendency of multinational enterprises to locate employment close to markets and in areas of lowest-cost production as well as the growing internationalization of the telecommunications and informatics sector. If these propositions are generally correct, then, the implications for telecommunications policy are relatively clear in that they would tend to favour increased competition as generating higher levels of employment than other forms of industrial structure but also a cautious approach to industrial policy which would ensure that as many of these new and revised jobs are created in Canada as is consistent with international market conditions.

The debate over the impact and implications of technological change and the "high tech" industries on employment is a wide-ranging one which continues to engage the attention of numerous Canadian and international observers. As of the late 1970's, one assessment of the debate concluded that it was essentially political in character with a sharp polarization of views among optimists and pessimists and with numerous factors both of supply and demand which had to be specifically taken into account. Nevertheless, according to this assessment, a new balance between technology and human labour did seem to be emerging. [Zeman, 1979] Since that time, several more specific points have been established. First of all, Canada as well as other advanced industrial nations have become predominantly "information economies" where a majority of workers are employed in creating and handling information rather than in producing natural or manufactured goods. Secondly, the occupational structure of Canada and other advanced industrial nations is changing but this does not necessarily mean severe negative employment effects. Thirdly, the "high tech" manufacturing sector in Canada is too narrow to sustain major employment growth but the services sector has considerably greater potential. Fourth, technological change is placing a heavy premium on labour market adjustment programs to train new workers with appropriate skills and retrain those workers displaced by technological change. [Peitchinis, 1981; Rostow, 1983; Tomaskovic-Devey and Miller, 1983; Bird, 1984] The debate continues unabated but the initial proposition that the balance between technology and human labour is changing is certainly being demonstrated.

With regard to Canadian telecommunications specifically, there has been relatively little work done on the technological change and its impact

on employment. However, juxtaposition of what we know about the structure of the telecommunications and informatics sectors in Canada with recent work on job creation and changing employment patterns can be suggestive. For example, we know that the informatics sector in Canada has been creating jobs considerably more rapidly than the Canadian telecommunications sector in recent years but that the latter is composed primarily of relatively large, Canadian-owned companies with a world-class technological capability while the former tends to be characterized either by the domestic subsidiaries of foreign multinationals or medium- and smaller-sized Canadian firms. Recent studies of job creation and employment patterns in Canada record a net decline in manufacturing employment between 1974 and 1982 which parallels the basic pattern in the telecommunications sector but contrasts with that in the informatics sector. Moreover, jobs have tended to be created more by the birth of new companies rather than by expansion undertaken by established companies, disproportionately by small firms as opposed to larger ones and especially those engaged in services rather than manufacturing, and with job creation particularly strong in the Western provinces and Ontario. [DRIE, 1984] Likewise, other recent studies of technological change and its impact on employment in Ontario specifically project that telecommunications and computer manufacturing will grow modestly over the next 10 years while computer services are expected to skyrocket. [Ontario Task Force on Employment and New Technology, 1985]

These employment studies and others which are only now being conducted promise to provide better information upon which to base any linkage of telecommunications policy and employment policy. Their interpretation and use, however, require caution. One strategy which might be suggested is that, in order to get "the biggest bang for the buck", there should be an

informatics-oriented, services-based, small business-targetted employment strategy underlying telecommunications policy. However, one must also take into account the fact that, because of the predominant role of foreign multinationals and the "footloose" character of the smaller services firms, the informatics sector is considerably less responsive to government direction than is the telecommunications sector. An alternative strategy - and one which is very much reinforced by developments in other policy areas like trade policy and research and development policy - would be to "play to your strength" and focus on maintaining and enhancing employment growth within the telecommunications sector where Canadian firms are well-established and relate well to government policy. And, then, there are some who would question whether or not government should even be attempting to maximize employment growth as part of its telecommunications policy rather than simply providing good service and an appropriate climate for business growth. [Peitchinis, 1984] It is our view that telecommunications policy in Canada will, in future, have to be considered in relation to employment policy at least in terms of a better understanding of their interrelationship but that employment growth should not and cannot be a major policy objective of telecommunications policy. Instead, this is one area where government might be best advised not to link the two policy areas too closely together but rather to pursue a pragmatic course of sustaining and hopefully expanding employment in both the telecommunications and computer manufacturing areas as best as possible while relying upon the burgeoning services sector which is inherently competitive and largely unresponsive to planning as the primary engine of job creation.

Research and Development Policy. What is more important in the longer

term than the marginal utility of creating any additional job in the telecommunications and informatics sector is the establishment and maintenance of a research and development capability. Industrial innovation in any country is a complex and continuous process which allows firms or governments to undertake R & D and market the new or improved products which result both domestically and/or on the world scene. [Mansfield, 1982; Bolen, et. al., 1984] The precise role of R & D in the innovation process itself, the justification for government support of R & D, specific factors affecting the scope and intensity of that support and the various ways and means whereby it can be delivered are all matters of substantial controversy in Canada and elsewhere. Canada is widely regarded as devoting too small a percentage of GNP to R & D but the more specific impact and implications of R & D in the telecommunications and informatics sector are not so easily characterized. [Science Council, 1984; MOSST, 1985] Measured in terms of support for and investment in continuing R & D, the telecommunications sector stands out as a major Canadian success story while the informatics sector would seem to conform more to the weaknesses and problems usually identified with R & D in Canada. Among the major differences between the two sectors are such factors as the impact of vertical integration, the effects of foreign ownership, the importance of exports, and the appropriateness of tax credits versus subsidy programs as mechanisms for supporting R & D. In addition, there are broader aspects of science policy such as the proper division of labour between public and private sector science activities, the collaboration among government, universities and industry, and the question of mission-oriented R & D which should also be taken into account. [Task Force on Technology Development, 1984] With regard to the link between R & D policy and telecommunications policy, then, it is clear that the stimulation and encouragement of R & D

has long been a major feature of industrial policy in the telecommunications sector but that pursuit of this goal is being complicated by increased competition which makes it more difficult for government to promote innovation.

Even on the most basic issues of R & D policy, there is substantial controversy in the existing literature. Most analysts would argue that R & D is of critical importance to economic growth in a small and open economy like Canada but evidence on the relationship between R & D expenditures and economic growth at the national level are generally inconclusive, as witness the example of Japan at least until recent years, although there is more evidence to support the hypothesis at the sectoral or industry level. [Palda, 1984; Longo, 1984] With regard to firm size and R & D success, the pattern is also mixed with some evidence to support the Schumpeterian notion that large and diversified firms like Northern Telecom are necessary in order to mount successful R & D efforts such as the digital PBX program while others point to the experience of medium and smaller firms like Mitel or GEAC doing R & D on specialized products or processes which can also prove quite successful. [Bollinger, Hope and Utterback, 1983] Even the question of whether Canada suffers from an innovation gap and whether R & D expenditures should be increased provokes disagreement. Many would argue that there is no innovation gap per se, although there may be certain rigidities in capitalizing and diffusing technological innovation, while others believe that there is nothing magic or mandatory about meeting Canada's long-heralded target of 1.5% of GNP devoted to R & D. [Palda, 1984; Kotowitz, 1985] Where there appears to be an emerging consensus in the literature on R & D policy concerns the rationale and justification for government support. Despite a few objections to the contrary, most

observers agree that government support for R & D as part of the innovation process is appropriate - however much many of them would prefer to keep the level of support minimal and the mechanisms whereby it is provided as neutral as possible. [Tarasofsky, 1984; Kotowitz, 1985]

The broad outlines of the Canadian R & D effort by industry, as of 1982, were as follows:

* Two hundred and thirty-one firms spent more than $1 million on R & D.

* Canadian-owned firms accounted for 57 per cent of industrial R & D expenditures; foreign-owned firms made up the balance.

* Seventy-one per cent of the funding for industrial R & D came from the performing firm, and some 13 per cent (excluding tax incentives) came from either the federal or provincial governments.

* The average ratio of R & D to sales was 1.2 per cent, a 50 per cent increase over 1975. Both foreign- and domestically-owned firms increased their R & D/sales ratios. As a group, Canadian-owned firms tend to spend a higher proportion on R & D in relation to sales than do foreign-owned firms operating in this country.

* R & D/sales ratios tended to be highest in the aircraft, communications equipment and engineering-services industries. Some 28 per cent of industrial R & D occurred in the communications-equipment industry, 12 per cent in wells and petroleum products, and 10 per cent in aircraft and parts. [Royal Commission, 1985]

There are also a number of more specific concerns about R & D policy as it relates to the telecommunications and informatics sectors. Most observers would agree that the affiliation between Bell Canada and Northern Telecom has been instrumental in allowing both to build up and sustain their R & D capability and provide a continuing Canadian base for innovation in products and services. Its very success, however, has in theory at least limited the possibilities for other domestic telecommunications firms to grow and establish their own R & D capability, except in "niche" markets, while certainly constraining foreign equipment suppliers from establishing in Canada to conduct R & D and compete in the domestic market. [Globerman and Diodat, 1980] When one compares this

experience with that of the informatics sector, one finds that a different industry structure - combined with more or less open access on the part of foreign multinationals to the domestic market -has not resulted in anything near the same degree of R & D intensity, despite continuing attempts to prod these companies to adopt world product mandates or the often subsidized efforts of smaller Canadian firms to build their R & D capability. In terms of promoting and protecting Canada's R & D capability, vertical integration in the telecommunications sector has been uniquely successful and government is no doubt well aware of the need to keep the management and technology functions of a company like Northern Telecom in Canada.

Despite attempts to prove the contrary, foreign ownership has in the past been associated with relatively low levels of R & D and, without specific government intervention, this pattern is likely to be continued and have particular impact on the informatics sector. Through aggressive promotion of world product mandates and express government support through subsidy programs and tax incentives, however, foreign-owned multinationals can be encouraged to do more R & D in Canada and this has already begun to happen to a greater extent. [Globerman, 1984; Sarna, 1984] The role of export markets is also crucial to maintaining and enhancing Canada's R & D capability. Firms like Northern Telecom could not mount the kind of R & D efforts which they do if it were not for the returns which can be expected from sales in export markets while many of the medium and smaller Canadian telecommunications and computer firms operating in "niche" markets have always been heavily dependent on export sales. If Canada's R & D capability is going to be sustained and enhanced, government should support R & D not only for the domestic market but also specifically because of its

export potential while at the same time continuing its assistance to Canadian firms operating in world markets. [Tarasofsky, 1984; Science Council, 1984] And finally, there is the matter of tax incentives versus subsidy programs, or a mix of both, as the appropriate mechanism for supporting R & D. This is essentially a technical issue of instrument choice which will be discussed later but it is important for our purposes to note that, irrespective of the eventual pattern of choice, governmental support for R & D should and usually can be justified in each case in terms of inadequate private returns and excess social benefits. [Kotowitz, 1985]

The link between R & D policy and telecommunications policy, then is a vital one. Building and maintaining a world-class R & D capability has been a goal which has long been pursued and for the most part accomplished within the telecommunications sector in Canada. Continuing government support for R & D is widely accepted as legitimate even though there may be disagreement about how government organizes itself to provide that support and the most appropriate mechanisms for doing so. Much of that support should probably be passive in the form of a continuing acceptance on vertical integration but, in other instances, support can take more direct forms. Particularly in a country like Canada, it has to be recognized that private returns to R & D may well prove inadequate to spur the innovation process and, in those circumstances, direct government support in the form of tax incentives or subsidy programs are more than justified. At the same time, however, government support for R & D should normally be provided on a discretionary basis and when other private sector sources of support have proven unavailable and where the social benefits to Canada, including those derived from projected export as well as domestic markets, are demonstrably in excess of private returns to capital. Especially at a time when the role of R & D is under considerable attack as a result of measures to

control the deficit, it is necessary to continue to assert its continuing importance in telecommunications policy and to protect and enhance Canada's R & D capability in this area when developments in other policy areas like competition policy, trade policy or foreign investment policy might be going in a different direction.

Industrial Development Policy. Canada's industrial development policy over the years has been a mix of interventionist and laissez-faire measures where the balance between the two has shifted moderately in response to changing circumstance and intellectual fashion. The interventionist impulse is an expression of the greater role which the state has played in Canadian economic development and has taken on a variety of forms ranging from public enterprise through regulation to financial support for industrial development. The laissez-faire counterbalance arises from the still predominant place of private enterprise within the national economy, the resistance which this raises to too much government intervention and the spur which it gives to creativity and entrepreneurship. [Bliss, 1982; Tupper, 1982] The telecommunications sector in Canada is an excellent example of these two contradictory tendencies at work. Canadian telecommunications rests overwhelmingly in private sector Canadian hands but governmental intervention in all the major forms has been a prominent feature of its development. The telecommunications sector in Canada has always been entangled in "the governmental embrace" but that relationship has been changing somewhat in recent years from closeness to cordiality. [Schultz, 1982] Following the unsuccessful efforts to formulate an "industrial strategy" for Canadian manufacturing during the late 1970's and early 1980's, industrial development policy has tended more towards laissez-faire and away from government intervention. Privatization,

regulatory reform and decreasing financial support for industrial development are all indications of this trend which has now been confirmed in the present government's commitment to a "hands off" approach to policy-making. Government seems to favour no particular industrial development policy for the telecommunications sector or for most other industry sectors but, with the exception of R & D or regional development objectives, prefers to take a neutral stance and concentrate on overall economic management concerns.

This preference for a more neutral stance comes after a period of spirited debate over industrial policy in Canada and elsewhere in the industrialized world. The two sides in the debate are well known. The proponents of industrial policy - some of whom go so far as to favour an explicit industrial strategy - feel that government should do more to identify particular industrial sectors and target particularly promising firms within those sectors for industrial development assistance. According to this view, governments at home and abroad are already deeply involved in the process of "picking winners" through a variety of existing policies and programs and that this activity should be acknowledged and improved. Japan, in particular, is often cited as being most proficient at "picking winners" as part of its industrial policy even though no formal "industrial strategy" is in place. [Shephard, 1983] The opponents of industrial policy argue that government should limit itself to creating the economic conditions within which business and industry can prosper and leave the task of "making winners" to the private sector. They are highly critical of the ability of politicians and bureaucrats to make solid business decisions where their own money and job security is not directly involved and want government to stand back and only provide industrial development and other assistance when and where the private sector clearly

needs it. When looking for an example of this approach, one is usually referred to West Germany or the United States as prominent examples of this approach at work. [George, 1983] As it relates specifically to the telecommunications sector in Canada, the issue boils down to whether government should mobilize all its various policy instruments and deliberately shape industrial development within the sector as a model for other sectors of Canadian manufacturing - something which the Science Council has in the past suggested - or whether government should concentrate primarily on economic management concerns and take primarily a neutral stance as most people in the telecommunications sector itself would prefer. As well, there is also a possible middle ground which would allow government some scope for continuing intervention to provide strategic direction for an industry like telecommunications while at the same time concentrating primarily on overall economic management concerns and this more pragmatic, less ideological approach to industrial policy is presently gaining greater attention.

Government support for industrial development in Canada presently involves a variety of subsidy programs, tax incentives, loan guarantees and contracts. Subsidy programs for industrial support grew rapidly in the 1970's, reached a peak of 1.5% of total federal expenditures during the 1970's, and have been declining since then. As we have seen earlier, the telecommunications sector has received an above-average but still modest proportion of these funds under programs such as the new Industrial and Regional Development Program (IRDP), which subsumes a host of earlier programs, the Defence Industry Productivity Program (DIPP), and other assorted programs. Only in a most general sense can it be said that these subsidy programs were "targetted" for high-tech industries since the total

funds available were allocated regionally and many grants went primarily to declining industries. The corporate tax system, exclusive of the SRTC, has also been used in various ways to stimulate industrial development and, by the 1980's probably accounted for about 3% or so of total federal expenditures. While it is not possible to identify how specifically and extensively available tax incentives were used in the telecommunications sector, it is known that only the resource industries have been able to benefit disproportionately from tax incentives. Loan guarantees and other forms of "bailout" have become more prominent during the 1980's but, with the exception of the sell-off of Consolidated Computer Limited, the telecommunications sector has been basically free of the need for such drastic action. And finally, the use of government contracts as a way of supporting industrial development has likewise been minimal in the telecommunications sector, although the scope for this technique as part of a revamped procurement policy may be increasing. [Royal Commission, 1985]

The major issues which arise with regard to industrial development policy and have implications for telecommunications policy are the issues of "targeting" and strategic management of the Canadian industrial portfolio. Targeting high-growth industries like telecommunications and informatics is an often-advised way of encouraging industrial development and one which some countries like Japan and France have used with mixed success. During the early 1980's, government did attempt to identify winning industries with particular attention to those where there were opportunities for import substitution and telecommunications and computer equipment both emerged as target industries. However, government was never able to carry out this exercise nor to follow through on the results right down to the level of individual firms or products. Where firm-specific targeting has taken place in Canada, it has not been on the basis of any

comprehensive analysis which would separate winners from losers but rather in terms of the use of "chosen instruments" such as Spar Aerospace in the satellite communications market. Canada's experience with targeting, then, has not been all that sophisticated and what success it has achieved has generally been limited and idocyncratic. [George, 1983; Steed, 1983; Dermer, 1984] A more sophisticated and promising direction for industrial development may be emerging in efforts to apply strategic management to Canada's industrial portfolio. In this exercise, manufacturing industries are grouped into categories according to their basic internal characteristics and each category - "high tech", mature, declining, etc. - is examined in terms of the mix of policies and instruments which would best suit the conditions and prospects of each category and there is no attempt to go down to the firm-specific level. The telecommunications and informatics sector stand out in the high technology category for which the strategy recommended by one team of commentators is market-oriented and includes an emphasis on civilian rather than military markets, a strong export orientation, and financial assistance to promising firms in the early stages of development whether Canadian- or foreign-owned. Moreover, this strategy might be best put into effect by locating within the appropriate department "a small, policy orientated group with highly developed skills in strategic, market and financial analysis" which could negotiate "Memorandum of Understanding" with suitable firms. [D'Cruz and Fleck, 1985] While heavily corporatist in tone, strategic management might be more effective and appealing both to industry and government than targeting exercises where politicians and bureaucrats have not proven all that successful in "picking winners".

Regional Development Policy. Regional development policy is largely a

sub-set of industrial development policy and has been recognized as such in departmental reorganization since the early 1980's. Industrial development had become an increasingly important feature of government's regional development policy which originated in the 1960's and had traditionally included a variety of additional features such as infrastructure, agriculture, resource development, etc. Canada's regional development policy has traditionally stood out in comparison to other countries because of its explicit nature and the extent to which it influences economic management as a whole and many other areas of public policy. Regional development policy has evolved from a clutch of individual programs for different regions and for different types of social and economic development to general development agreements signed between the federal government and individual provinces and eventually to the present-day ERDA's which consolidate the emphasis on economic development in each province. The telecommunications and informatics sectors initially received very limited attention as one of the key infrastructure elements within a region but have subsequently come to be treated more as industries which certain provincial governments might wish to designate as areas for sub-agreement and shared federal-provincial support under the Economic and Regional Development Act program. As we noted before, this has already happened in the case of Manitoba and Quebec. [Governments of Canada and the Provinces, 1985] Moreover, individual companies have also responded to attractive locational tax incentives and specific provincial government inducements to locate their main or additional plants in a particular region. With regard to the telecommunications and informatics sectors, Northern Telecom maintains what amounts to its own regional development program with plants operating in virtually every province while one of the more important occurrences in the last decade or so has been the emergence

of "high tech" industry centres like "Silicon Valley North" around Ottawa, "Silicon Flats" in Saskatoon, Bromont in Quebec, and the Halifax-Dartmouth area. [Steed, 1983] While not linked directly to regional development policy, telecommunications policy like most other areas of public policy in Canada is expected to reflect this important dimension of the country.

The most important issue arising from the interface between regional development policy and telecommunications policy relates to the question of whether or not it is appropriate to actively encourage the telecommunications and informatics sectors to locate in less developed regions of the country. "High tech" industries, because of the nature of their products and the relatively low importance of transportation factors, would seem to be ideally suited for location in areas away from the industrial heartland of the country and the products which they themselves produce and of which they presumably make extensive use are inherently decentralizing in character. At the same time, telecommunications and informatics firms are highly prized additions to the local industrial base both in more developed and less developed areas of the country and the locational competition for such firms is intense. However, one of the key factors which a firm must take into account in locating in less-developed regions is the availability of skilled manpower to work in their plants and deliver their services as well as suitable amenities for management and employees. If telecommunications and informatics technologies are as inherently decentralizing as they are supposed to be and in view of the locational incentives already in place, then, one would expect that the less developed regions would in due course get their share of these facilities. [Lesser, 1982] In point of fact, however, roughly 60% of the domestic shipments of telecommunications equipment originate in Ontario and

figures are similar though less significant for the informatics area because of its heavy import component. Government should decide whether such a pattern is acceptable in the telecommunications and informatics sectors or whether more deliberate attempts to link regional development policy and telecommunications policy are warranted but it must also keep in mind that, in this instance, the market seems to have spoken.

Foreign Investment Policy. Foreign investment policy has been one factor limiting the access of foreign firms to Canadian markets but it has been neither the only factor nor the most important one when other factors like tariff and non-tariff barriers and domestic regulatory practice are taken into account. Since 1974, Canada has had foreign investment review legislation in place which mandated government to pass on all takeover and new business proposals beyond a certain monetary value. Just recently in 1985, that original legislation was replaced with less onerous and more positive legislation which raised the monetary thresholds and eased the criteria of assessment while continuing the foreign investment review process in much the same way as previously. By way of comparison, Canada maintains virtually the full array of policies which many industrial countries follow in dealing with direct investment from abroad, although not all of these policies apply to the telecommunications and informatics sector. Unlike the situation in some other countries like Japan, France, Australia and even the United States where telecommunications is treated as a "key sector" where foreign ownership is restricted, Canada has not formally designated telecommunications in such a fashion. It does, however, treat foreign takeovers and new business proposals relating to the telecommunications and informatics sectors within the normal scope of its foreign investment review legislation. As well, Canada also has used investment incentives and performance requirements to discipline foreign

investors seeking permission to operate and does follow some practices which provide for exceptions to national treatment for foreign firms already established in the country. [Safarian, 1983] Nevertheless, with regard to the telecommunications sector, there is little evidence that foreign investment review has been utilized explicitly to limit access to the domestic market and the predominance of foreign multinationals in the informatics sector gives mute testimony to how open the Candian market can be in certain areas. Thus, there has been no real attempt to link foreign investment and telecommunications policy directly.

The one issue which has arisen more indirectly with regard to the telecommunications and informatics sector is treatment of foreign multinationals operating in Canada. Many foreign multinationals in the informatics sector have been established in Canada for many years and hold significant shares of the market while doing proportionately less in terms of domestic manufacturing, R & D, and export business. These firms usually do not depend on government subsidy programs to contribute to their growth and development and fiscal measures are only of limited value in influencing their behavior, therefore, foreign investment review of takeovers and new business proposals is one opportunity for government to oversee their activities in Canada. Through this process as well as through other forms of suasion, government has attempted to get many of these companies to provide their Canadian subsidiaries with "world product mandates" which would not only rationalize their business operations but also allow them to move into export markets and several of the major multinationals like Control Data and Burroughs have done so. World product mandates are a step in the right direction but by no means a panacea for ensuring a greater Canadian presence in the informatics sector. [Poynter

and Rugman, 1982; Sarna, 1984] With regard to the telecommunications sector, the situation is quite different. Several foreign telecommunications companies, primarily equipment suppliers but potentially service providers as well, are moving into Canada either as a result of takeover or new business proposals. Microtel has long operated in Canada as the manufacturing subsidiary of GTE; Ericcson, Siemens, Plessey and, until recently, ITT have all maintained sales and/or manufacturing operations in Canada; A T & T Communications has received permission to market telecommunications and computer equipment in Canada and could in future want to expand into services; and, more recently, British Telecom has moved to take over CTG which gives it a major presence in the domestic interconnect industry and, even more significantly, Mitel Corporation which gives it entree to Canadian and foreign equipment markets. Foreign investment policy gives little indication of being excessively restrictive on foreign firms operating in the Canadian market and some would suggest that it should be more restrictive in certain cases such as the Mitel takeover where Canadian-developed and government-supported technology is falling under foreign control. [Wex, 1984] Nevertheless, foreign investment policy with regard to the telecommunications and informatics sectors probably should be flexible given international market conditions and the expectations which Canadian companies have for operating in foreign markets. As well, in the final analysis, it is not foreign investment policy per se but other factors like tariff and non-tariff barriers and domestic regulatory practice which most limits access to the Canadian market.

Procurement Policy. Procurement policy is often a relatively unnoticed area of policy which, under certain circumstances, could have a considerable impact on the telecommunications and informatics sector. In

the telecommunications sector, it can be conceptualized as the public sector counterpart to vertical integration between the major carriers and their suppliers in that government buys and operates much of the equipment and services which it requires for government telecommunications purposes. With regard to the informatics sector, procurement policy is handled according to competitive bidding practices but with a premium allowed for bidders meeting "Canadiana" requirements. Federal government purchases of telecommunications goods and services through the Government Telecommunications Agency totalled some $500 million in 1983 of which $350 million or 70% represented operating or capital expenses incurred with the telecommunications carriers and equipment suppliers. [GTA, 1985] Procurement of other goods and services through DSS totalled over $5 billion in 1983 of which at least over $500 million or 10% went to computer and communications equipment and services. [DSS, 1985] Government has been moving slowly to harness this untapped resource which might be used to serve competition and/or industrial policy goals. GTA has become involved in providing more than basic telecommunications and has been moving towards the merging of telecommunications and computer technologies in an integrated office systems mode; an annual procurement plan and strategy has been developed by DSS which has recently stressed the need to respond to client needs for integrated office systems and software; and Treasury Board is increasing its capability to manage both the telecommunications and EDP functions within government. Despite these developments, there is not yet a clear indication that procurement policy is going to be used deliberately and systematically and linked in an effective manner to telecommunications policy.

The basic issue facing procurement policy in the telecommunications

and informatics sectors relates to how commitment to competitive bidding practices can be meshed with a legitimate interest in serving industrial policy purposes. Competitive bidding practices are viewed as the touchstone of good procurement policy and any attempt to undermine this principle is viewed as dangerous. However, using government procurement as a means of achieving industrial and other policy goals is most appealing because of the direct and immediate impact of such purchasing decisions. [Task Force on Technology Development, 1984] On the telecommunications side, government as user confronts virtually a monopoly supplier of services and equipment with the same incentives for bypass which face other major users. With regard to informatics, government as buyer operates in a highly competitive market but one which is dominated on the equipment side by foreign multinationals operating in Canada and complicated on the services side by a wide array of possible ways of meeting client needs. In both telecommunications and informatics, there is the imperative to "buy Canadian" wherever possible while, of course, attempting to meet client needs in the best feasible way. Add to this a number of different pressures which also bear upon procurement policy. Small Canadian firms look to government contracts as a promising way of developing their products and getting a good start in business. Multinationals in Canada expect that they will be treated similarly to Canadian firms as long as they do a reasonable proportion of their manufacturing in Canada. Clients and users tend to prefer tried and true sources of supply like "Ma Bell" or "Big Blue". Government procurement and vertical integration are cited by foreign competitors as prime examples of non-tariff barriers in the Canadian market. Government also finds itself under pressure to conform to international agreements such as GATT's procurement code. [Science Council, 1985] In this context, government is required to formulate and implement a

logical and consistent procurement policy which fits with the basic thrust of a telecommunications policy which is itself far from clear. Procurement policy, then, is a good place to conclude our discussion of telecommunications policy and its interface with other policy areas because, in a microcosm, it neatly captures the underlying dynamics and basic dilemma which government must face in reconciling increased competition to industrial policy in the telecommunications sector.

CHAPTER FIVE: THE CHANGING ROLE OF POLICY INSTRUMENTS IN THE TELECOMMUNICATIONS SECTOR

In this final chapter we will attempt to relate our broad conclusions about the appropriate role of competition in industrial policy in Canadian telecommunications to the use of specific policy instruments. Having discussed the problems of departmental and policy coordination and the proper role of the DOC within this context, our attention will now shift to how to relate industrial policy goals in telecommunications to the available policy instruments and to assess which of the instruments seem most appropriate. Thus we will begin with a discussion of the nature and relevance of policy instruments, proceed to introduce and discuss our criteria for the evaluation of policy instruments and then discuss separately each of these instruments referring to the criteria of assessment where they are relevant.

5.1 The Notion of Policy Instruments and Their Evaluation

The concept of policy instruments as alternative means for the delivery of government policies is one that has gained widespread popularity over the last decade or so. [Woodside, 1983; Doern and Phidd, 1983] The idea of looking at the full range of policy instruments has served to broaden our understanding of government beyond the standard fixation on public expenditures. Governments can be seen to influence decisions and behavior through a whole host of actions - regulations, tax incentives, direct governmental ownership and suasion or promotional activities as well as the more conventional emphasis on spending or grant programs. The idea of broadening our understanding and recognition of government involvement not only allows a more accurate recognition of the full scope of government but also makes us aware of changes in the way

governments respond to and deal with issues. Thus in the mid-1970's as public attention came to focus on the growth in direct government spending, there was a rapid growth in other forms of spending, specifically through greater use of tax expenditures. Similarly and more recently concern for the size and persistence of the federal deficit has aroused more interest in using policy instruments that do not impinge as greatly on this deficit.

At the same time these policy instruments are recognized to have different characteristics. They differ with respect to the degree of coercion they are felt to involve, in their visibility, in the incidence of the benefits they confer, and in the political process that they engender. For instance the federal government can transfer funds from the public sector to the private sector through either a tax measure or an expenditure grant but the two instruments are evaluated very differently and may be more or less appropriate given the circumstances and the purposes of the transfer. Particular instruments can also be adjusted to make them more or less coercive in nature. Thus, the recent emphasis by the CRTC on "regulating with a lighter hand" is a case in point of a move toward a less coercive regulatory policy. Thus changes can occur not only as a result of a switch from one policy instrument to another but also in the ways in which any one particular instrument is used.

Policy instruments can be evaluated in terms of a variety of criteria and we will focus on five in particular. The first criteria is that of allocative efficiency. The fundamental question it raises is whether the government is getting good value for its investment of public funds. Thus, can government money be properly targetted in order to minimize the cost of a policy decision and can firms that do not need the assistance be excluded from access to its benefits. The twenty-fold increase in the cost of the SRTC to the public treasury as compared with its original estimated cost is

a case in point. In a period of scarce resources these considerations are important for government and they have been central to the debate over two of the policy instruments in particular - grants and tax incentives - and ironically while the latter have become increasingly the more acceptable political choice, the former is usually regarded as the most efficient in allocative terms.

The second criteria of evaluation is that of political feasibility. Here we refer to popular attitudes toward the use of particular policy instruments. It is no secret that certain policy instruments elicit more negative responses because of ideological associations that tap very fundamental political attitudes or because of the degree of direct governmental involvement they require. In recent years, public ownership has lost much of its viability as a political option and indeed the pressure has been in the opposite direction, questioning the existence of established crown corporations and even proposing the privatization of existing public corporations. At the same time, government itself may find policy instruments that add to the level of public expenditures less acceptable in a period when sensitivity to government spending is high.

The third criteria is that of legal authority. In this instance the reference is to what a department or commission can legally do, taking into account its legislative mandate. Where a department or commission has both specific responsibilities and limited instruments available to it by law, it will naturally be forced to somehow deal with the problem using the instrument resources it has available to it, regardless of whether they are appropriate to the issue at hand. The CRTC frequently finds itself in a position where its decisions have significant industrial policy implications and yet it is limited, in a strictly legal sense, to the use

of regulation to achieve those goals. At the same time, if it is proposed to deal with a problem using a different policy instrument or blend of policy instruments, the result may involve a new constellation of departments and even a new approach to the problem at hand.

The fourth is the distributional implications for regions, individuals and companies. For instance, one might note that a particular instrument tends to benefit firms in a start-up position (i.e. a grant program) while another instrument may be more useful to firms that are established and profitable (i.e. a tax incentive). Similarly some measures can be more readily targetted to benefit firms in particular regions of the country, a constant concern in Canadian politics, or to aid certain categories of people such as small investors. The capacity to design an instrument in order to achieve specific goals is crucial and policy instruments differ as to how well and narrowly they can be targetted as well as how easily they can be structured to achieve both market and non-market goals.

The fifth and final criteria is that of the need for accountability. Here the issue is how much scrutiny and involvement will government and the public have in the use of particular instruments. Since government involvement necessarily gets it mired in the decisions of management, firms generally prefer to keep government involvement at a minimum. However parliamentary traditions require a degree of accountability to government officials for the use of public money that may make it difficult to fully respect the preferences of firms. For our purposes, the most important consideration is that policy instruments vary in the kind of and degree of accountability that is required by tradition and law. Thus a grant programme will have its estimated costs approved by Parliament while a tax incentive can be sanctioned without even the barest estimate of the level of spending, in terms of revenues foregone, that it will involve.

The concept of policy instruments is a relatively new addition to the corpus of ideas used in the study of government policy-making and the speed with which it has been adapted by analysts suggests that it satisfies an important need in the study of the modern administrative state. It allows us to look more closely at the alternative ways in which government can attempt to achieve its goals and it allows us to differentiate and assess the instruments chosen in terms of their appropriateness to the stated purpose. The growing demand for competitive solutions in telecommunications requires readjustments in the use of existing policy instruments in order to liberalize markets and to allow more freedom of movement for firms in the private sector. Instruments that involve a less direct role for government have gained popularity but, at the same time, government must be sensitive to the need to meet goals other than increased competition as well. The demands for increased competition must and should be accommodated but competition, it should be remembered, is a means to an end and not an end itself.

5.2 A Clouded Future for Public Ownership and Control

Public ownership has been an important, although relatively infrequently used, policy instrument in telecommunications because of the significance attached to communications with respect to issues of national sovereignty and public policy. In Canada, it has been most prevalent in the three prairie provinces, with government-owned telephone companies established in each province since early in the century, but it has also been used by the federal government as well. [Buchan, 1982; Tupper and Doern, 1981; Economic Council of Canada, 1984] The federal government established what is now Teleglobe Canada during the 1940's in order to establish Canadian control over our overseas telecommunications and also

has a half interest in Telesat Canada, the domestic satellite company, which was established in 1968 to contribute to an improved domestic communications infrastructure. A major theme among the proponents of increased competition has been the desirability of privatizing crown corporations, especially Teleglobe, and at the same time reconsidering the status of Telesat and its shared ownership between government and the telcos. [Ohashi and Roth, 1980] At the same time, there has been an expressed desire to discourage government directed or controlled projects such as the Telidon project and the Office Communications Systems (OCS) project. In this section we will consider the desirability of such initiatives within the context of assessing public ownership and control as a policy instrument.

Public ownership as an instrument of government policy-making has a number of justifications and advantages and is often presented as an alternative to regulation. [Prichard and Trebilcock, 1982; Prichard, 1983] Some authors see the use of public corporations as evolving from a number of factors - a desire to monitor an industry, the need to reconcile and coordinate a variety of objectives through a single organizational structure as well as constitutional considerations such as the desire to avoid taxation by the other level of government. Public ownership has also had some appeal as a symbolic act of commitment, as necessary to offset the lack of adequate competition in the marketplace, as a way of taking advantage of the relatively closed character of decision-making within crown corporations and, finally, as a means of avoiding the consequences of the weaknesses inherent in regulation which involves a less direct attempt to control behavior than public ownership. Most commentators downplay the role of ideology in the establishment of public corporations, giving weight

instead to pragmatic and functional factors.

In recent years, public ownership has lost favour politically for a number of reasons. First, the ideological climate has shifted considerably over the last decade as market-based solutions have gained greater acceptance. In Britain and Japan, the national telephone systems have been partially privatized over the last two years and even in France, where nationalization still retains much of its political appeal, there has been some talk about the possibility of privatizing the DGT. [Economist, 1985] In Canada, there is no suggestion that the prairie telcos have been considered for privatization but in the resources area there has been some activity, particularly in British Columbia and Saskatchewan. Second, governments have become especially sensitive to the potential costs to the public treasury of public corporations. Deficits run up by crown corporations can be a source of embarrassment and a jolt to governmental financial planning. Corporations like Teleglobe that run a continual profit can also become the object of criticism, although for quite the opposite reason, and the government's involvement may be hard to justify under such circumstances. In Canada, this has not been a major practical problem in the telecommunications sector but it should not be discounted as a source of the unrest in attitudes toward existing crown corporations.

The political feasibility of changes in the status of Teleglobe and Telesat seems quite high at first glance, given the present popularity of privatization, but on closer examination it seems fraught with difficulties. The fact of the matter is that both Teleglobe and Telesat could have great trouble surviving on their own and, in the case of Teleglobe, regulation would have to be introduced to replace public ownership. Teleglobe does most of its business and receives most of its revenues from the telcos and, if it were not sold to the telcos themselves,

privatization would require the imposition of explicit regulation of the relationship between the carriers and Teleglobe or otherwise the carriers might well bypass it by using cheaper U.S.-based facilities. Even if Teleglobe were sold to the telcos, regulation would be necessary to prevent them from using Teleglobe to cross-subsidize other activities or, in the event of competition in the provision of long distance services, from impeding access by competitors to the network. At the same time there is considerable provincial opposition to selling Teleglobe to Bell Canada, the most likely purchaser among the telcos, and an alternative, the sale of Teleglobe to Telecom Canada, would probably require the reorganization and incorporation of Telecom Canada, which at present, seems an unlikely prospect.

Telesat, for its part, might like to be spun off as a separate entity but most observers feel that its situation is economically vulnerable and that its survival, without financial backing from the telcos and/or the federal government would be in doubt. One alternative would be to merge Telesat and Teleglobe into a single crown corporation with the latter's financial strength available to subsidize the former's technological weakness. If, eventually, there is going to be competition in the long distance market this may well be the only viable option but, at the same time, it would not be received enthusiastically by either Teleglobe or Bell Canada and would in effect entail not a reduction in public ownership but rather an increase in public ownership. This would be a development that ran contrary both to the general trend in thinking about government involvement in the 1980's and to apparent government policies in this area. On the other hand, privatization of Teleglobe and the government's holding in Telesat would not really reduce government involvement but only change

its character with new regulatory requirements replacing public ownership as the means of delivering government policy.

The privatization of Teleglobe and Telesat also throws into question the "Canadian content" dimension to purchases by the two companies. Both Telesat and Teleglobe, whether required by law or as a matter of practice, provide opportunities for Canadian manufacturers in making their purchases and these requirements are important in providing sales opportunities for Canadian corporations. As a result, certain firms have acquired a kind of "chosen instrument" status, benefitting from the degree of security in terms of sales and hopefully able to translate this into a capacity to compete internationally. While there are analysts who are critical of this approach it seems to have had some success in the case of Spar Aerospace. However with privatization it is unlikely that such content provisions could be sustained and Canadian manufacturers that have been their beneficiaries would lose in the process.

Finally there are questions about government run innovation projects such as Telidon and OCS and the future of such efforts or of projects like them. The evaluation of the two projects has not been very positive and few observers are very supportive of this type of government action in the telecommunications or computer sectors. Given the rapid pace of technological change and the speed with which firms must be able to respond to prospective opportunities, most observers feel government officials serve themselves and their clients best when they retain a reasonable distance from the firms they are trying to help and do not allow themselves to become parties to the innovation process itself. Government must attempt to be orderly and judicious in its decision-making while the reality of the high tech field is disorderly and opportunistic. While it is difficult not to do something in sectors of the economy such as the

computer and office equipment markets where Canadian-owned firms have had little success, the evidence suggests that government-directed projects are not the way to facilitate improvements to the situation.

The issues related to public ownership and control and the direction that government should move in this area are complex and have far-reaching implications. Privatization of Teleglobe and the government holding in Telesat will do much less to reduce governmental involvement and intervention than appears to be the case at first glance. Instead it will only change the nature of this involvement, raising new and perplexing regulatory issues in its place. As well, the elimination of public ownership would effectively end the possibility of using a "chosen instrument" approach such as has benefitted Spar Aerospace. Finally, turning to the attempts of government to direct innovation as in the cases of Telidon and the OCS projects, most critics feel they are out of step with the character of the emerging telecommunications and informatics markets. The levels of governmental involvement that they entail may be inappropriate to the fast-moving developments that characterize these high tech markets and government officials may too readily lose track of the market-driven forces that must be accommodated.

5.3 Regulation and the Changing Pattern of Its Usage

Regulation whether by the CRTC or the DOC has been widely used in telecommunications as an alternative to public ownership and as a means of achieving specific goals in communications policy. In recent years, however, the character of this regulation has changed considerably as entry, price and rate of return regulation of private sector monopolies has been slowly giving way to "regulated competition" in some telecommunications markets and as means have been found to generally relax

the degree of control sought by government. What role should regulation have in the shaping of industrial policy in telecommunications policy? Should regulation be tied to the achievement of industrial goals and if so, how should this be done? Regulation may take many different forms, varying in its comprehensiveness, and the detail and closeness with which it is applied. [Doern, 1978] In our case studies we have encountered regulation in barriers to market entry, segmented regulation of the telcos in new markets like enhanced services and resale and sharing, licensing and de-licensing by the DOC, "Canadian Sourcing" and regulations with respect to "preferred supplier" relations between the telcos and equipment suppliers.

However before going on with this discussion it is useful to consider some of the characteristics of regulation as a policy instrument. [Stanbury and Lermer, 1983; Doern, 1979] Regulation is often thought of as the major alternative to public ownership and that it is a "hidden" form of government activity providing government with "...a way of redistributing income/wealth in a non-obvious fashion". [Stanbury and Lermer, 1983, p. 381] Regulation allows government to pursue certain non-market goals such as universal telephone service through the application of rules intended to structure the behavior of the regulated firms and it does so both without effecting the ownership of the firm and by displacing the costs of the policy onto the private sector. Regulation therefore is a relatively inexpensive form of activity for government and one whose real costs for the economy are hard to assess. It is also more indirect than public ownership as a way for government to achieve its goals.

General political attitudes toward regulation are much more mixed than they are about public ownership. In some policy areas, especially involving social considerations, regulation is dramatically increasing as

governments seek to prevent environmental, health or other threats from being realized. In other areas, in particular certain sectors of the economy like air transportation, there is the possibility of reduced regulation in the future. [Schultz, 1983; Schultz and Alexandrof, 1985] The informatics market has been and still is largely unregulated in Canada while the telecommunications market is undergoing major changes as the government's regulators attempt to adjust regulatory rules to allow for more competition, introduce cost-based pricing and, where there is competition, to control the market power of the telcos. There seems to be growing political support for further relaxation of the regulations in telecommunications and it is likely that government will continue to move in that direction in the years to come. Furthermore, at least over the short and immediate term, it is unlikely that once a form of regulation has been relaxed or eliminated government will be able to reverse its steps.

The first dimension to regulatory policy that needs to be examined is how regulation should be used as an instrument of industrial policy. Both the CRTC and the DOC are increasingly in the position of creating new markets and industries through their decisions and thus, whether explicitly or not, they have become involved in industrial policy issues. For instance, should the CRTC be required explicitly to take industrial benefits into account in making its decisions? We would suggest that any broadening of the CRTC's mandate in this way should be avoided because the CRTC already claims to be overburdened and probably lacks the expertise and experience necessary to perform such a role. If such a change were introduced the quality of CRTC decisions might suffer as a result. Instead we would suggest that a proper use of the directive power would see the CRTC advised on the industrial policy components of a decision through the use of this power. An improper use of this power would be for the CRTC to

be directed as to which firms it should favour in performing its regulatory function. At the same time with respect to CRTC and even DOC decisions that involve issues related to industrial benefits, decisions should originate with those whose normal responsibilities are to deal with such issues.

A second issue is whether the problem of bypass can be dealt with by means of regulatory instruments. The prevention of bypass is often treated as a regulatory issue and there is no doubt that the federal government has the legal powers to prevent some forms of bypass. However, while the regulatory capacity to control some forms of bypass exists, the political feasibility of effectively using these instruments is low. The recent experience with efforts to control the use of satellite dishes is instructive as to the limits in the exercise of the law and in the case of bypass one might be dealing not just with ordinary citizens but rather with powerful institutions and companies.

A third issue relates to the government's tolerance for the vertical integration of telcos and their equipment suppliers. Until recently the issue had been put on the back burner but the upcoming negotiations over free trade promise to bring it to the forefront. [Director of Investigation and Research, 1976] There are a number of possible options the government could follow in dealing with this issue. One might be the nationalization of Northern and/or Bell Canada but for a whole host of reasons this option is a non-starter. A second approach might be to require Bell Canada Enterprises to divest itself completely of Northern but this too seems to offer few benefits for Canada. While it might result in lower equipment costs for the telcos and would be a boost for competition within Canada, the likely result would probably be the complete Americanization of

Northern and in the aftermath Canada would lose its only end-to-end equipment supplier for the telephone industry as Northern moved to consolidate its investment in its areas of economic strength. [Northern Business Information, 1984; Takach, 1985] A third and possibly more reasonable solution would be putting an end to the "preferred supplier" relationship enjoyed by Northern and now sought by AEL Microtel. Bell Canada already claims that it buys equipment on a lowest-cost basis and with Northern's across-the-board strength in the Canadian telecommunications market, including the non-Bell Canada market, it is likely that such a change would not unduly harm Northern while it might partially satisfy critics south of the border.

The use of regulation seems likely to remain an important part of the federal government's arsenal of policy instruments to control and direct developments in the telecommunications marketplace. At the same time the new competitive forces constitute a significant limiting factor in the use of regulation, forcing the regulator to find ways to integrate competition into the regulatory regime, what might be called re-regulation. However it is important that regulatory authorities not be drawn too much into the making of industrial policy decisions. Where industrial policy considerations seem appropriate to a particular decision it is desirable that the officials with the appropriate expertise be involved if the results are likely to be satisfactory.

5.4 Defining a Proper Role for Taxation

A third policy instrument available to government is taxation. Taxation as a general government policy instrument is very unpopular but, as a result, measures that provide for relief from taxation are very well received. Since the mid-1970's when government expenditures came under

increasing scrutiny measures for tax relief have come to be used with increasing frequency. [Woodside, 1982] Tax incentives have long been a central part of Canada's R & D policy and by all accounts the support they provide is relatively generous as compared to other countries like Japan which have depended more on tariffs, purchasing policy and assistance through the capital market. [McFetridge and Warda, 1983; Mansfield and Switzer, 1985] However if tax policy is to play the important role we require of it and if R & D investment requirements in the telecommunications and informatics market remain as high as they have been in recent years, the government's approach to the use of taxation may have to be not only generous but also better targetted so as to get the best mileage out of our tax dollar investment.

Tax policy is generally seen as being the major alternative to government subsidies or grants but the two instruments differ in some fundamental ways. [Woodside, 1982] To begin with, unlike expenditures the costs of tax incentives are difficult to estimate in ways that satisfy all commentators - the concept of tax expenditures is itself controversial in the business world and the dollar values attached to them depend on a number of assumptions that not all participants are willing to accept. Since the costs of tax incentives are less well known, there is less public scrutiny of the beneficiaries. As well, existing tax policy instruments can be accessed and used voluntarily and at the discretion of the business manager with the result that businessmen feel they are left more autonomy in their decisions as compared to grants, a factor that is central to their popularity. Tax incentives are of more value to firms with taxable income and profits than they are to smaller firms in a start-up position, so there are significant implications for the firms that will benefit. Tax instruments fit into the IC/IP problem not so much because they are

inherently more competitive than subsidies but because they seem less interventionist and thus more in tune with the times.

There are a number of criticisms of how tax policy instruments are used that warrant mention. First, because Finance and Revenue Canada are the custodians of the system their officials tend to get involved in a wide area of decision-making, often making decisions in areas far beyond their normal expertise. Secondly, as corporate tax rates decline and exemptions or measures providing special treatment proliferate, the value of any new incentives declines. Thirdly, the tax approach has been widely criticized for its allocative inefficiency and the lack of political accountability that it entails. Nevertheless, since a reform of the tax system that would bring down the overall rates through the elimination of many of the established incentives is politically unlikely, there is going to be continuing pressure on the tax authorities to develop new tax instruments to deliver more money to those performing such activities as research and development.

The case of the SRTC is a useful one to consider in this light. [Loveland, 1984] The SRTC was clearly intended to provide a mechanism whereby, much like a grant or subsidy, funding could be delivered to those conducting R & D activities at the time they most need it, that is at the beginning of the process. Toward this goal the SRTC attempted to marry the popularity of tax relief measures to some of the advantages of the grant approach, in particular the targeting of financing for R & D and especially the provision of this aid early in the process. As well, a market for the exchange of these credits was created so that firms without taxable income could benefit and the tax relief credits could be sold to those who could use them. Unfortunately, the SRTC proved difficult to adequately target

and the provision ended up being discredited as many of its beneficiaries could only loosely be regarded as using the money for real research. Hopefully the government's experience with the SRTC will serve to strengthen the hand of those who believe that grants have their proper role and that tax relief measures cannot easily be targeted to benefit firms involved in research at the time they really need the help.

A second problem with the use of the tax system relates to questions of definition. Among policy instruments, taxation is one whose use is most governed by the law and thus questions of definition and meaning are of paramount importance. What, for instance, is research under the tax code? What kind of R & D does the government wish to stimulate? Obviously this is a crucial problem and any answer to it will greatly influence the kind of research that is given assistance. It may be that interpretations of tax code provisions focus too much on the "sky blue" kind of research and insufficiently on the kind of R & D that occurs on the factory floor. [Northern Telecom, 1984] However, by its very nature tax law has difficulty making such distinctions relying as it must on indicators such as the kinds of facilities involved as guides to the kind of research involved. While these procedures may be necessary from the point of view of Revenue Canada - as a means to control usage of the deduction - they do not deal with the practical reality of the kind of activity the business is actually doing. For this reason the tax system, once again, may not be the appropriate instrument to deal with some of these problems.

It appears that too much is expected of the tax system and its administrators. The goals pursued through taxation have gone far beyond just the raising of revenue and it is now utilized as an incentive structure for all manner of activities. The practical solution would be to eliminate most deductions and lower the nominal rates but this has been

proven time and again to be beyond the political capacity of the government. The complexity of the tax system ensures that any provision like the SRTC, no matter how well intentioned, will be abused and end up costing the government more than it need have. Excessive dependence on the tax system as the vehicle to deliver R & D support may be popular in the short term but is likely to be counterproductive and should likely be avoided.

5.5 The Continuing Need for Government Subsidies

One of the age old methods for government to assist a firm has been to subsidize it through direct payments or subsidies. [Harris, 1985; Ministry of State for Science and Technology, 1982; Walley, 1985] In recent years Canadian policy-makers have become quite cool toward the idea much less the reality of subsidies. Indeed senior ministers have made their preference for tax-based instruments quite clear in recent years, associating subsidies with "losers" and tax breaks with "winners" as in the phrase that the government sought to "reward success not effort". [Watson, 1984; Science Council, 1981] Subsidies can be seen to be explicit as in the case of a grant program or implicit as was the case with the policy toward earth station ownership prior to 1984. Since the concept of an implicit subsidy can extend to a variety of measures including regulatory and tax instruments we will restrict our discussion to explicit subsidies.

Subsidies have a number of significant characteristics. First of all their costs are easily assessed and quantified. These costs appear in the estimates and they are well reviewed by Parliament, at least in comparison to other instruments. Furthermore their costs are readily targeted and easily controlled through limitations in their funding. They involve a high degree of government accountability in that their costs are highly

visible and thus cannot easily be ignored. They also involve a high degree of governmental involvement in that officials will supervise and review the expenditure decisions as they occur and this feature in particular has soured many attitudes toward their use. Grants presently are low in political acceptability but nevertheless have important advantages that should not be lost.

One way in which government can assist the private sector is through procurement policy. [Stairs and Winham, 1985] This is an approach that has not been an important part of federal policy and has in fact probably been used more frequently and with more consistency by the provincial governments. Many of those we interviewed regard procurement policy as one of the most effective ways to assist the private sector in that it gives a firm some guaranteed sales, allowing them to establish a track record for their product, and some of these same people noted the great success which this instrument has had in Europe and in Japan. While any such move to establish a coordinated procurement policy would run contrary to the spirit of free trade negotiations, it should possibly be given more attention should such negotiations fail.

A second way of using subsidies, and one that is quite atypical, is by the designation of "chosen instruments" by government. [Science Council, 1984] The idea behind this approach is most closely associated with the Science Council and it involves the concentration of certain types of government aid on a particular firm in the hope that it will eventually be internationally competitive. This support can be given in a variety of ways but is most commonly associated with direct subsidies and Spar Aerospace is an example of such a firm. One observation that might be made about Spar's experience is that there is a need for consistency and

persistence in the use of this approach - it does no good to designate a chosen instrument and then deny it the coordinated support that it needs. It may be that the grants approach is too hard to insulate from regional political pressures to be an effective base upon which to found a "chosen instrument" approach.

Our perspective on the use of grants as a policy instrument within the context of the IC/IP problem is considerably more positive than that expressed in recent years by many spokesmen for the federal government. Compared to tax policy instruments, grants or subsidies are much more open to scrutiny and appraisal by others and this visibility may result in the problems associated with the use of grants being greatly overstated. The government "overspent its budget" (i.e. the original estimated cost) in the case of the SRTC by about $2.5 billion and yet the issue barely escaped the business pages of Canada's newspapers. There is good reason to believe that the government gets much better value for its expenditures through subsidy programs than through the tax system and, indeed, this may account for some of the unpopularity of subsidies. It may be necessary, therefore, for the government to shoulder some more of the political risks involved in the use of subsidies if it is to be more effective in assisting industry.

At the same time there may be some useful ways for government to improve upon and adjust its delivery of subsidies so as to enhance their political attractiveness. In particular it may be necessary to devise a less bureaucratic and hierarchical process for their administration. One possibility might be to establish a forum of peer review committees to examine proposals for subsidization - separate or joint committees of both researchers and practical businessmen with relevant expertise - and have them advise the government on the acceptability of a proposed project. Much as with the refereeing of academic journal articles these committees

could deal with proposals "anonymously" and advise the ministry on their value. Of course problems of confidentiality would have to be dealt with in some manner but once accepted by the relevant department the recipient could be given substantially more leeway by the government (than is usual in grant programs). As well in order to guard against abuse of public moneys audits could be undertaken (in the manner of taxation policy) of a certain proportion of the projects being financed. A second possibility would involve the government accepting an equity position in the firms it supports. In this way subsidies would seem less like give-aways and more like the investments in our national future that they are. If the project turned out well, not all of the benefits would be assigned to the private investor and the public contribution to the success of the project would be recognized in financial terms. Procedures could be established to require the government to divest itself of this holding at some point in the future so that **direct** government equity involvement would be of limited duration. While these proposals are merely intended to be illustrative of the possible changes that could be made to grant programs they reflect our general belief that the use of subsidies by the government should not be curtailed in favour of tax incentives. Subsidies appear to be the more allocatively efficient instrument and with government finances such as they are this is an important feature, even if it involves some political risk.

5.6 Planning and Promotional Activities on the Part of Government

Planning and promotional actions undertaken by government is not really a policy instrument per se but rather a category of activity within government that must occur prior to any informed actions by government. Government is often thought of by the public as speaking with one voice but those who study its internal workings are quickly cured of that

misconception. There are, in fact, many voices articulating many different and often conflicting interests and yet if something is to be done these differing perspectives must be given some coherence. Tim Creery, in a 1982 study for the DOC, suggested that the Department needed to reconstruct its role within the government as pursuing "mediative planning". [Creery, 1982] In essence the proposal was that the DOC should act to ensure "that the various parts of the system and the various streams of policy and planning are relating properly with one another and doing their intended job for the public". In a sense it was suggested that the DOC perform a central agency or MOSST-type function for communications policy. If the importance of recent developments in telecommunications and informatics are not being exaggerated, the need for the DOC or some body to perform this function may be escalating every year.

Consider the case of bypass. This concern or threat is central to many of the pressing issues in telecommunications and yet relatively little public knowledge exists about it. [Brock, 1984] Was Bell Canada exaggerating the threat in the CNCP interexchange hearings, as many have suggested, or is their perception a realistic one? Clearly the reality and dimensions of bypass need to be assessed at the micro level of decisions by firms and organizations. How likely are firms to seek to bypass and how much is occurring? Secondly the issue needs to be examined in its macro aspects as well; that is what is or will be the impact of bypass on the economy as a whole and what may be the costs and benefits of such developments and dislocation. Finally what instruments does the government have available for use and how would they best be employed? The success of this strategy requires the development of a sense of common purpose and shared goals within government which may often seem far out of reach but

which should be continually pursued, none the less. Bypass decisions will be made in the private sector and it may be that suasion and regulation are the only effective policy instruments available to government but the effectiveness of these instruments will be greatly enhanced if government knows the true dimensions of the problem and what kind of action is necessary to successfully deal with it.

A second area where this kind of mediative planning would be useful is in studying the growing use and impact of fibre optics. A fibre optics network is being rapidly installed in Canada by the telcos and it promises to effect enormous change in the telecommunications industry. [Ross, 1982] Its potential impact warrants a measure of technological forecasting to assess some of its implications. In the first place the consequences for the industry itself should be assessed. Just as important is the need to assess the impact of this technological change for the society and economy as a whole. Given the fundamental character of many of the changes occurring, the government needs to prepare itself to deal with them and to be ready with an appropriate and timely response. Whether it be the impact on the copper industry, the implications of overcapacity or some of its social implications, the federal government owes the public a more reasoned and coordinated response.

Mediative planning is something the DOC should consider in defining its role. As the barriers between telecommunications and the computer industry continue to effectively erode, the impact of the changes is bound to be great, whether one is talking about employment, economic growth or any number of issues. At present many different groups across the government are talking about and promoting policies that are not only often at odds but may not be founded on any satisfactory understanding of the evidence. A role as mediative planner - not only with regard to federal-

provincial but also government-industry relations - is waiting to be filled and the DOC has many of the kinds of expertise and experience necessary to fill it.

5.7 Suasion and Its Appropriate Use

Suasion is an often overlooked instrument of government policy but one whose importance may well be on the increase in the telecommunications and informatics sectors. There are at least two reasons for the increased importance of suasion. In the first place it does not involve the spending of money or any loss of revenues and at a time when the deficit is high and in need of reduction this is an important advantage. As well, as long as the use of suasion is reasonable it has political advantages in that it demonstrates a concern while, at the same time, not requiring compliance from those it is aimed at. A second factor that may be leading to an increased dependence on suasion is that the increased competition in these markets is leading to a lighter regulatory hand on the part of the government and thus a situation in which the government must try to cajole more and insist less. Suasion is a form of liaison activity in which the government attempts to explain, in more or less coercive ways, its interests and persuade others to adapt their behavior to take into account those interests.

Suasion as a policy instrument is generally used where government either lacks the legal power to act more directly, couldn't or wouldn't accept or live with the costs (economic or political) that a more direct and law-based approach would require, or possibly as a means of achieving other less obvious goals. [Stanbury and Fulton, 1984] Suasion may include such acts as appeals with or without inducements, mass suasion through advertising, monitoring activities to alert the public to undesirable

activities, consultation hopefully leading to cooptation and controlled leaks of privileged information. Suasion involves low administrative and compliance costs and can be readily and easily implemented but its efficacy is not always clear and may well be low. The efficacy would certainly depend on how realistically it is used, whether the government seeks results that are unrealistic or those that can more easily be achieved. We will discuss three examples of the recent use or possible use of suasion.

In a first instance it has been suggested that suasion might well be used to encourage government departments, agencies and even large Canadian firms to "buy Canadian" where possible. It is sometimes said to be one of the strengths of the Japanese economy that the Japanese do not have to be discouraged from purchasing imports because they do it naturally - a kind of cultural non-tariff barrier. [Johnson, 1982] In Canada, we have had our "buy Canadian" or "buy Ontario" campaigns but they seldom go beyond mere advertising campaigns. For suasion to be successful and have some real impact in the marketplace we may have to approach domestic buyers the way we do or should approach buyers in foreign markets. This is particularly true in the informatics market where the natural inclination may be to buy IBM even when a Canadian-made product is quite competitive and where it may be necessary to convince domestic buyers to buy domestic products.

In a second case some of our interviewees suggested that the licensing of the cellular mobile radio operator, Cantel, may have involved the use of suasion. The December 1983 decision awarding Cantel one of the national licences was made with the expectation that Cantel would purchase as much of its equipment as possible in Canada. At the time there was good reason to believe that Novatel could provide the equipment though subsequently this proved not to be the case and Cantel eventually turned to Ericcson for

the provision of the switches. As a result of Novatel's failure to properly estimate the difficulty that would be faced by a new supplier in producing a cellular switch, the government tried to persuade Cantel to use as much Canadian-made equipment as possible. This attempt proved to be largely unsuccessful.

A third area where suasion might be used more forcefully is in the area of sales in foreign markets. [Ostry, 1981] While there seems to be considerable satisfaction with the role played by officials of External Affairs in the negotiation of overseas sales, the role played by elected politicians could be given a higher profile. In many countries politicians play very active roles in the selling of products and it may be that Canada's sales record could be improved if politicians could make foreign nationals more aware of Canada and its products. It may not always be enough to put together an attractive economic package to win over a buyer - the personal touch may be necessary, egos may have to be massaged and misinformation corrected.

We have suggested that suasion has many uses and may well be both underused at present and increasingly important in the future. Many forms of behavior - including purchasing decisions - are based on unconsidered predispositions and misinformation and the government of Canada may be in a position to clarify some of these misconceptions. At the same time suasion should not be used without care and proper consideration of the goals to be sought because the government can as easily discredit itself by attempting to achieve goals through unrealistic means as bring new (and inexpensive) gains to the Canadian economy.

A SEQUENTIAL/TOPICAL BIBLIOGRAPHY ON THE INCREASED COMPETITION/-INDUSTRIAL POLICY PROBLEM

This bibliography has been prepared not only as documentation for the report itself but as a general bibliography on the increased competition/ industrial policy problem. Citations are made to relevant material for each of the chapters of the report. Books and articles are presented in a sequential/topical manner and, in order to cut down on duplication, readers of later chapters will sometimes have to refer back to references in earlier chapters.

CHAPTER ONE: THE TELECOMMUNICATIONS SECTOR, INCREASED COMPETITION AND INDUSTRIAL POLICY

(A) Background to the Telecommunications Sector

Ara, G., A. Albert, M.A. Crener, and J.-P. Sallenave. The World Telecommunications Market: Characteristics, Structures, Trends. Ottawa: DOC/University of Ottawa, 1983.

Babe, Robert E. Cable Television and Telecommunications in Canada. East Lansing: Michigan State University, 1975.

_____. Performance Analysis of Selected Common Carriers, or,For Whom Bell Tolls? Ottawa: Department of Communications, 1976.

Baer, Walter S. "Telecommunications Technology in the 1980's." In Glen O. Robinson, ed. Communications for Tomorrow: Policy Perspectives for the 1980's. New York: Praeger, 1978. pp.61-123.

Beesley, M.E. Liberalization of the Use of the British Telecommunications Network. London: HMSO, 1981.

Brock, Gerald W. The Telecommunications Industry: The Dynamics of Market Structure. Cambridge, Mass.: Harvard University Press, 1981.

Buchan, Robert J., ed. Telecommunications Regulation and the Constitution. Montreal: Institute for Research on Public Policy, 1982.

Canada Consulting Group Inc. The Information Economy. Toronto: Ontario Ministry of Transportation and Communications, 1984.

Canadian Radio-television and Telecommunications Commission. Annual Reports. Ottawa: Minister of Supply and Services Canada, various years.

Canadian Radio-television and Telecommunications Commission. Telecommunications Decisions and Policy Statements. Ottawa: various years.

Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty. Telecommunications and Canada. Ottawa: 1979.

Cordell, Arthur J. The Uneasy Eighties: The Transition to an Information Society. Ottawa: Minister of Supply and Services, 1985.

Chapter I (cont'd)

Courville, Leon. Responsible Regulation: Rules versus Incentives? Montreal: C.D. Howe Institute, 1980.

Davidson, Alister F.F. and Ralph Fisher, eds. Seizing the Future: Opportunities For Canada in the 1980's. Toronto: Trans-Canada Press, 1983.

Department of Communications. The Supply of Communications Equipment in Canada. Ottawa: Minister of Supply and Services Canada, 1981.

Department of Communications. The Supply of Communications Equipment in Canada. Ottawa: Minister of Supply and Services Canada, 1984.

Department of Communications. Annual Reports. Ottawa: Minister of Supply and Services Canada, various years.

Department of Communications. Canadian Telecommunications: An Overview of the Canadian Telecommunications Carriage Industry. Ottawa: Minister of Supply and Services Canada, 1983.

Department of Communications. The Supply of Computer Communications Equipment in Canada. Ottawa: Minister of Supply and Services Canada, 1984.

Department of External Affairs. Communications: The Canadian Experience. Ottawa: 1985.

Department of Regional Industrial Expansion. Electronics Industry Performance: Statistical Summary 1984. Ottawa: 1985.

Department of Regional Industrial Expansion. Background Paper Prepared for the Information Technology Task Force. Ottawa; April 1984.

Ecole des Hautes Etudes Commerciale and the University of Victoria in collaboration with the Department of Communications, Government of Canada. Telecommunications in Canada: Economic Analysis of the Industry. Montreal: 1981. Two Volumes.

Doern, G. Bruce and Richard W. Phidd. Canadian Public Policy: Ideas, Structure, Process. Toronto: Methuen, 1983.

Economic Council of Canada. Reforming Regulation. Ottawa: 1981.

English, H.E., ed. Telecommunications for Canada. Toronto: Methuen, 1973.

Chapter I (cont'd)

Fedorowicz, Jan. Free Enterprise and The State: What's Right?-What's Left? What's Next? Toronto: Couchiching Institute on Public Affairs, 1985.

George Washington Center for Telecommunications Studies and McGill University Centre for Study of Regulated Industries. Policy Issues in the Canadian-American Information Sector. Montreal: 1984.

Gershuny, Jonathon and Ian Miles. The New Service Economy: The Transformation of Employment in Industrial Societies. New York: Praeger, 1983.

Globerman, Steven. "Economic Factors in Telecommunications Policy and Regulation." Institute for Research on Public Policy Conference Paper, 1984.

Gottlieb, Calvin C., ed. The Information Economy: Its Implications for Canada's Industrial Strategy. Ottawa: Royal Society of Canada, 1984.

Irwin, Manley R. Technology and Telecommunication: A Policy Perspective for the 80's. Working Paper 22. Ottawa: Economic Council of Canada, 1981.

_____. Telecommunications America: Markets Without Boundaries. Wesport, Conn.: Quorum Books, 1984.

Janisch, Hudson. "Winners and Losers: The Challenges Facing Telecommunications Regulation." Institute for Research on Public Policy Conference Paper, 1984.

Janisch, Hudson and Manley Irwin. "Information Technology and Public Policy: Regulatory Implications for Canada." Osgoode Hall Law Journal, Vol. 20 (1982).

Johnston, C.C. The Canadian Radio-Television and Telecommunications Commission. Ottawa: Minister of Supply and Services Canada, 1980.

McLaughlin, John F. and Anne E. Birinyi. Mapping the Information Business. Cambridge, Mass.: Harvard University Program on Information Resources, 1980.

McPhail, T.L. and S. Hamilton, eds. Proceedings of Communications in the 80's: Major Issues. Calgary: University of Calgary Press, 1984.

McPhail, T.L. and B.M. McPhail. Telecom 2000: Canada's Telecommunications Future. Calgary: University of Calgary Press, 1985.

Chapter I (cont'd)

National Telecommunications and Information Administration. Telecommunications Policies in Seventeen Countries: Prospects for Future Competitive Access. Washington, D.C.: U.S. Department of Commerce, 1983.

Nora, S. and A. Minc. L'Informatisation de la Societe. Paris: 1978.

Nordicity Group Ltd. New Communications Technology and Services. Ottawa: 1983.

Oettinger, Anthony and Carol L. Weinhaus. Players, Stakes and Politics of Regulated Competition in the Communications Infrastruture of the Information Industry. Cambridge, Mass.: Harvard University Program on Information Resources, 1981.

Ogle, E.B. Long Distance, Please. Toronto: Collins, 1979.

Ontario Economic Council. Government Regulation: Issues and Alternatives 1978. Toronto: Ontario Economic Council, 1978.

Organisation for Economic Cooperation and Development. Telecommunications: Pressures for Change. Paris: OECD, 1983.

Peat, Marwick and Partners. A Review of Revenue Settlement Practices and Procedures Employed by Members of Telecom Canada. Three volumes. Toronto: 1979-1980.

Porat, Marc. The Information Economy: Definition and Measurement. Washington, D.C.: U.S. Department of Commerce, 1977.

_____. "Communications Policy in an Information Society." In Glen O. Robinson, ed. Communications for Tomorrow: Policy Perspectives for the 1980's. New York: Praeger, 1978. pp.3-60.

Price Waterhouse Associates. Towards a Policy Framework for the Economic Development of the Communications/Information Sector. Ottawa: Department of Communications, 1981.

_____. Environmental Assessment of the Telecommunications Equipment and Informatics Sector in Canada. Ottawa: Department of Communications, 1985.

Province of Ontario, Ministry of Transportation and Communication. Current Trends in Major Telecommunications Technologies. Toronto: 1984.

Pryde, Alan. Deregulation: Boon or Burden? Ottawa: Canadian Centre for Policy Alternatives, 1985.

Chapter I (cont'd)

Research Institute of Telecommunications and Economics (Tokyo). "A Vision of Telecommunications." Intermedia. Vol.11 (January 1983). pp.26-33.

Royal Commission on the Economic Union and Development Prospects for Canada. Report, Vols. I, II, and III. Ottawa: Minister of Supply and Services, 1985.

Schiller, Dan. Telematics and Government. Norwood, N.J.: Ablex, 1982.

Schultz, Richard. "Regulation as a Maginot Line: Confronting the Technological Revolution in Telecommunications." Canadian Public Administration. Vol.16 (Summer 1983). pp.-302-218.

Schultz, Richard and Alan Alexandroff. Economic Regulation and the Federal System. Toronto: University of Toronto Press, 1986.

Serafini, Shirley. The Information Revolution and Its Implications for Canada. Ottawa: 1980.

Serafini, Shirley, M. Andrieu and M. Eastabrooks. "Post Industrial Canada and the New Information Technology." Canadian Futures. n.d. pp.81-91.

Stanbury, W.T, ed. Government Regulation: Scope, Growth, Process. Montreal: Institute for Research on Public Policy, 1980.

Stanbury, W.T. and Fred Thompson. Regulatory Reform in Canada. Montreal: Institute for Research on Public Policy, 1982.

Telecom Canada. The Information Movers. Ottawa: 1983.

Thomas, David. Knights of the New Technology: The Inside Story of Canada's Computer Elite. Toronto: Key Porter Books, 1983.

Trebilcock, M.J., R.S. Pritchard, D.G. Hartle and D.N. Dewees. The Choice of Governing Instruments. Ottawa: Economic Council of Canada, 1982.

U.S. House of Representatives, Committee on Energy and Resources, Sub-Committee on Telecommunications. Telecommunications in Transition: Status of Competition in the Telecommunications Industry. Washington, D.C.: 1981.

Wilson, The Hon. Micheal H. "A New Direction For Canada: An Agenda for Economic Renewal." Ottawa: 8 November 1984.

Chapter I (cont'd)

Woodrow, R. Brian, Kenneth Woodside, H. Wiseman and J. Black. Conflict Over Communications Policy. Montreal: C.D. Howe Institute, 1980.

Woodrow, R. Brian and Kenneth W. Woodside. "Players, Stakes and Politics in the Future of Canadian Telecommunications Policy and Regulation." Institute for Research on Public Policy, 1984.

(B) Background to Increased Competition

A.D. Little Inc. World Telecommunications Survey II. Boston, 1980.

_____. World Markets for Information Processing Products to 1993. Boston, 1984.

Agnew, Carson E. and Anthony A. Romeo. "Restructuring the US Telecommunications Industry: Impact on Innovation." Telecommunications Policy. Vol.5, No.4 (Dec. 1981). pp.273--288.

Alper, Joel R. "Marketplace Differences Between Domestic and International Facilities and Services." Telematics and Informatics. v.1, n.2 (1984). pp.171-178.

Armstrong, Donald. Competition versus Monopoly: Combines Policy in Perspective. Vancouver: Fraser Institute, 1982.

Bain, J.S. Barriers to New Competition. Cambridge, Mass.: Harvard University Press, 1956.

Barker, Robert. "Bell Wringer: Bypass Threatens Regionals' Revenues." Barrons. v.65, n.22 (3 June 1985). pp.13, 23-23.

_____. "The Future is Now." Barrons. v.65, n.32 (12 August 1985). pp.11, 18-20.

Baumol, William J. and Robert D. Willig. "Telephones and Computers: The Costs of Artificial Separation." Regulation. (March/April, 1985). pp.23-32.

Bergendorff, Hans, Torsten Larsson and Ruben Naslund. "The Monopoly v Competition Debate." Telecommunications Policy.- v.7, n.4 (December 1983). pp.297-308.

Besen, Stanley M. "Deregulating Telecommunications." Regulation. (March/April 1978). pp.30-36.

Chapter I (cont'd)

Bolter, Walter G. Telecommunications Policy For The 1980's: The Transition to Competition. New York: Prentice-Hall, 1985.

Cornell, Nina W. "Rate-of-Return Regulation: Protecting Whom From What?" Regulation. (November/December 1980). p.36-41, 49.

Cornell, Nina W., Daniel Kelly and Peter R. Greenhalgh. Social Objectives and Competition in Common Carrier Communications: Incompatible or Inseparable? Washington, D.C: FCC, 1980.

Cornell, Nina W., Micheal D, Pelkovitz and Steven R, Brenner. "Toward Competition in Phone Service: A Legacy of Regulatory Failure." Regulation. (July/August 1983). pp.37-42.

Cornwall, Diane L. "Competition in U.S. Subscriber Equipment Market: 1990." In Kathleen Landis Lancaster, ed. International Communications, User Requirements and Supplier Strategies. Lexington: D.C. Heath and Co., 1983. pp.173--179.

D.A. Ford and Associates. U.S Experience With Competition in Long Distance Telephone Service. Toronto: Ontario Ministry of Transportation and Communications, 1984.

Dalfen, C., L. Waverman, J. Yale, and L. Dunbar. New Entry into Telecommunications in Canada. Ottawa: Department of Communications, 1982.

Denny, Micheal, Melvyn Fuss and Carol Everson. Productivity, Employment and Technical Change in Canadian Telecommunications: The Case for Bell Canada. Ottawa: Department of Communications, 1979.

Dingell, John D., Timothy E. Nulty and Mark McCarthy. "...or a Free Ride for AT&T?" Challenge. v.27, n.1 (March/April 1984). pp.30-33.

Donlan, Thomas G. "The Battle is Joined: IBM Goes Head-to-head With AT&T." Barrons. v.65, n.26 (1 July 1985). pp.13, 22-24.

Drucker, Peter. "Beyond the Bell Breakup." The Public Interest- v.77 (Fall 1984). pp.3-27.

Ergas, Henry. "Should There Be More Competition in Telecommunications?." OECD Observer. n.121 (March 1983). pp.30-33.

Ergas, Henry and Jun Okayama. Changing Market Structures in Telecommunications: Proceedings of an OECD Conference held 13-15 December 1982. Paris: OECD, 1984.

Chapter I (cont'd)

Feketekuty, Geza and Jonathon D. Aronson. "Meeting the Challenge of the World Information Economy." The World Economy. v.7, n.1 (March 1984). pp.63-86.

Flax, Steven. "The Latest Way to Foil the Phone Monopoly." Fortune. 16 April 1984. pp.108-111.

Fuss, M. and L. Waverman. The Regulation of Telecommunications in Canada. Ottawa: Economic Council of Canada, 1982.

Geller, Henry. "Can Government Maintain the Status Quo in Terms of Regulation in the Communications Sector?" Canadian Regulatory Reporter 4 (1983). pp.5.41-5.43.

Grant, Peter. Competition Policy and the Canadian Telecommunications Carriers. Toronto: mimeo, 1976.

Grubel, Herbert. Free Market Zones: Deregulating Canadian Enterprise. Vancouver: the Fraser Institute, 1983.

Hoffman, Kurt. "Microelectronics, International Competition and Development Strategies: The Unavoidable Issues." World Development. v.13, n.3 (March 1985). pp.263-272.

Janisch, Hudson. "Competition: American Export -- Canadian Import?" Canadian Regulatory Reporter. Vol.4 (1983). pp.5--33.

Johnson, Harry G. Technology and Economic Interdependence. London: Macmillan, 1975.

Johnson, Leland. Competition and Cross-Subsidization in the Telephone Industry. Rand Corporation R-2976-RC/NSF. December 1982.

Kahn, Alfred E. The Economics of Regulation. New York: Wiley, 1970.

_____. "A Needed Dose of Competition..." Challenge.- v.27, n.1 (March/April 1984). pp.24-29.

Kelley, David. "Local Monopoly?" Barrons. v.65, n.36 (9 September 1985). p.9.

Komiya, Megumi and Jean-Luc Renaud. "Privatising Japanese Telecommunications." Intermedia. v.13, n.2 (March 1985).- pp.14-17.

Kwerel, Evan. Promoting Competition Piecemeal in International Telecommunications. Working Paper 13. Washington: Federal Communication Commission, 1984.

Chapter I (cont'd)

Langdale, John. "Competition in Telecommunications." Telecommunications Policy. v.6, n.4 (December 1982). pp.283-299.

_____. "Competition in the United States' Long-Distance Telecommunications Industry." Regional Studies. v.17, n.6 (December 1983). pp.393-409.

Le, Can D. "Impact of Communications Industries on the Canadian Economy: An Input-Output Analysis." Unpublished paper, 1985.

MacAvoy, Paul V. and Kenneth Robinson. "Winning By Losing: The AT&T Divestiture and Its Impact on Telecommunications." Yale Journal on Regulation. Vol.1 (1983). pp.1-42.

Mansfield, Edwin. The Economics of Technological Change. New York: W.W. Morton, 1968.

MarTech Strategies Inc. Telecommunications in Seventeen Countries: Prospects for Future Competitive Access. Washington, D.C.: National Telecommunications and Information Administration, 1983.

McGowan, William G. "The New Competition in US Telecommunications." Intermedia. v.10, n.1 (January 1982). pp.45-47.

Militzer, Kenneth and Martin H. Wolf. "Deregulation in Telecommunications." Business Economics. v.20, n.3 (July 1985).-pp.27-33.

Morici, Peter. The Global Competitive Struggle: Challenges to the United States and Canada. Toronto: C.D. Howe Institute, 1984.

Morris, Roy L. and Robert S. Preece. "Negotiating Improved Interconnection Between US Telcos and Their Competitors." Telecommunications Policy. Vol.6, No.3 (September 1982). pp.179-198.

Noam, Eli, ed. Telecommunications Regulation Today and Tomorrow. New York: Harcourt Brace, 1983.

Olley, R.E. and C.D. Le. Total Factor Productivity of Canadian Telecommunications Carriers. Ottawa: Department of Communications, 1984.

Peat Marwick and Partners. Impacts of Competition in Message Toll Telephone Service. Toronto: 28 September 1984.

Chapter I (cont'd)

Phillips, Almarin. "Regulatory and Interfirm Organizational Burdens in the US Telecommunications Structure." Columbia Journal of World Business. v.18, n.1 (Spring 1983). pp.46-51.

Pryde, Alan. Deregulation: Boom or Burden? Ottawa: Canadian Centre for Policy Alternatives, 1985.

Regan, Timothy J. "The Foreign Side of Deregulation." Journal of Telecommunications Networks. v.3, n.4 (Winter 1984). pp.344--347.

Senate Committee on Foreign Affairs. Canada-United States Relations. Ottawa: 1975, 1978, 1982.

Snow, Marcellus S. "Telecommunications Deregulation in the Federal Republic of Germany." Columbia Journal of World Business. v.18, n.1 (Spring 1983). pp.53-61.

Solomon, Arthur H. "Market Entry Strategies for Telecommunications Equipment Suppliers." In Kathleen Landis Lancaster, ed. International Communications, User Requirements and Supplier Strategies. Lexington: D.C. Heath and Co., 1982. pp.3-24.

Tomita, Tetsuro. "Japan's Policy on Monopoly and Competition in Telecommunications." Telecommunications Policy. v.8, n.1 (March 1984). pp.44-50.

Williamson, O.E. Markets and Hierarchies: Analysis and Anti--Trust Implications. New York: Free Press, 1975.

U.S. Congress, Office of Technical Assessment. International Competitiveness in Electronics. Washington, D.C.: 1983.

Zysman, John and Laura Tyson, eds. American Industry in International Competition: Government Policies and Corporate Strategies. Ithaca, NY: Cornell University Press, 1983.

(C) The Background to Industrial Policy

Albert, Alain and Maxime A. Crener. "Les nouvelles politiques industrielles: le cas des telecommunications." Etudes internationales. v.14, n.3 (septembre 1983). pp.453-467.

Badaracco, Joseph L., Jr. and David B. Yoffie. "Industrial Policy: It Can't Happen Here." Harvard Business Review. v-61, n.6 (November/December, 1983). pp.96-105.

Chapter I (cont'd)

Bartha, Peter. "Industrial Policies: A Pragmatic View." Business Quarterly. v.49, n.1 (Spring 1984). pp.78-81.

Barton, John H. "Coping With Technological Protectionism." Harvard Business Review. v.62, n.6 (November/December, 1984). pp.91-97.

Beckman, Christopher C. "Strategies of Industrial Adaptation: A Review of the Debate." Executive Bulletin. n.25 (February 1983). pp.1-16.

Bliss, M. "The Evolution of Industrial Policies in Canada: An Historical Survey." Discussion Paper 218. Ottawa: Economic Council of Canada, 1982.

Bluestone, B. and B. Harris. The Deindustrialization of America. New York: Basic Books, 1982.

Breton, Albert. A Conceptual Basis for an Industrial Strategy. Ottawa: Economic Council of Canada, 1974.

Curzon-Price, Victoria. Industrial Policies in the European Community. London: Trade Policy Research Centre, 1981.

Davenport, P., C. Green, W.S. Milne, R. Saunders and W. Watson. Industrial Policy in Ontario and Quebec. Toronto: Ontario Economic Council, 1982.

D'Cruz, Joseph R. and James D. Fleck. Canada Can Compete!: Strategic Management of the Canadian Industrial Portfolio. Montreal: Institute for Research on Public Policy, 1985.

De Vos, Dirk. Governments and Microelectronics. Ottawa: Science Council, 1983.

Diebold, John. Industrial Policy as an International Issue. New York: Council on Foreign Relations, 1980.

Eastman, H.C., and S. Stykolt. The Tariff and Competition in Canada. Toronto: Macmillan, 1967.

Economic Council of Canada. Looking Outward. Ottawa: 1975.

Economic Council of Canada, The Bottom Line. Ottawa: 1983.

Ellinghaus, W.M. "Impact of Industrial Innovation in the 1980's -- The Telecommunications/Electronics/Computer Industry." Research Management. Vol.24 (March 1981). pp.12-14.

French, Richard. How Ottawa Decides. Toronto: Lorimer, 1984.

Chapter I (cont'd)

George, Peter. Targetting High-Tech Growth. Montreal: IRPP, 1983.

Gottlieb, Calvin C., ed. The Information Economy: Its Implications for Canada's Industrial Strategy. Ottawa: Royal Society of Canada, 1984.

Gottlieb, C.C. and Z.P. Zeman. Towards a National Computer and Communications Policy: Seven National Approaches. Ottawa: Department of communications,1980.

Green, Christopher. Canadian Industrial Organization and Policy. Toronto: McGraw-Hill Ryerson, 1980.

Harris. Richard G. Trade, Industrial Policy and International Competition. Toronto: University of Toronto Press, 1985.

Jaffe, Irving. "Industrial Policies: Responses to a Common Core of Problems." OECD Observer. (1983).

Jenkin, Micheal. The Challenge of Diversity: Industrial Policy in the Canadian Federation. Ottawa: Science Council, 1983.

Johnson, C. MITI and the Japanese Challenge. Stanford: Stanford University Press, 1982.

Johnson, Chalmers. The Industrial Policy Debate. California: Institute for Contemporary Studies, 1984.

Kamien, M.I. and N.L. Schwartz. Market Structure and Innovation. Cambridge: Cambridge University Press, 1982.

Lazar, Fred. The New Protectionism. Toronto: Lorimer, 1981.

_____. "Canadian Industrial Strategy: A US Impediment." Journal of World Trade Law. v.16, n.3 (May/June 1982). pp.-223-235.

Lermer, George, ed. Probing Leviathan: An Investigation of Government in the Economy. Vancouver: The Fraser Institute, 1984.

Magaziner, Ira C. "Troubled Times Demand an Industrial Strategy." Canadian Business Review. v.10, n.1 (Spring 1983.-pp.28-31.

Matthews, Roy A. Structural Change and Industrial Policy: The Redeployment fo Canadian Manufacturing, 1960-1980. Ottawa: Minister of Supply and Services, 1985.

Chapter I (cont'd)

McKenna, Regis and Micheal Borrus. "Industrial Policy and International Competition in High Technology." California Management Review. v.26, n.2 (Winter 1984). pp.15-32.

Ministry of State for Science and Technology. Research, Development and Economic Growth. Ottawa: Minister of Supply and Services, 1985.

Morici, Peter, A. Smith and S. Lea. Canadian Industrial Policy. Washington: National Planning Association, 1982.

Neilson, R. "Should A Country Move Towards International Strategic Market Planning?" California Management Review. XXV (January 1983).

Neufeld, E.P. "Industrial Policy in Canada in the 1980's." Western Economic Review. Vol. 1 (1982). pp.14-33.

Ohashi, T.M. and T.P. Roth. Privatization: Theory and Practice. Vancouver: Fraser Institute, 1980.

Organisation for Economic Cooperation and Development. The Aims and Instruments of Industrial Policy. Paris: OECD, 1975.

_____. Selected Industrial Policy Instruments: Objectives and Scope. Paris: OECD, 1978.

Palda, Kristian S. The Science Council's Weakest Link: A Critique of the Science Council's Technocratic Industrial Strategy for Canada. Vancouver: Fraser Institute, 1979.

_____. Industrial Innovation: Its Place in the Public Policy Agenda. Vancouver: The Fraser Institute, 1984.

Pinder, John, ed. Industrial Strategies and the World Economy. London: Croom, Helm.

Porter, M.E. Competitive Strategy: Techniques for Analyzing Industries and Competitors. New York: Macmillan, 1980.

Quinn, James Brian. "US Industrial Strategy: What Directions Should It Take?" Sloan Management Review. v.24, n.4 (Summer 1983). pp.3-22.

Reich, Robert. The Next American Frontier.

_____. "Why the U.S. Needs an Industrial Policy." Harvard Business Review. (January-February 1982)

_____. "An Industrial Policy of the Right." The Public Interest. v.73 (Fall 1983). pp.3-17.

Chapter I (cont'd)
Rotstein, Abraham. Rebuilding From Within: Remedies For Canada's Ailing Economy. Ottawa: Canadian Institute for Economic Policy, 1984.

Schultze, Charles L. "Industrial Policy: A Dissent." The Brookings Review. v.2, n.1 (Fall 1983). pp.3-12.

Science Council of Canada. Hard Times, Hard Choices. Ottawa: Minister of Supply and Services, 1981.

_____. Canadian Industrial Development: Some Policy Directions. Ottawa: Minister of Supply and Services, 1984.

Thurow, Lester. "An Immodest Proposal For Canada." Canadian Business. (April 1983)

Tucker, Jonathon B. "Managing the Industrial Miracle." High Technology. v.5, n.8 (August 1985). pp.22-30.

Valaskakis, Kimon and Peter Sindell. Industrial Strategy and the Information Economy: Towards a Game Plan for Canada. Montreal: Gamma, 1980.

Vogel, Ezra F. "Japan and the Information Revolution: National Transformation." Journal of Telecommunications Networks.- v.3, n.4 (Winter 1984). pp.299-310.

Warnecke, S., ed. International Trade and Industrial Policies. New York: Holmes and Meier, 1978.

Watson, W. A Primer on Industrial Policy. Toronto: Ontario Economic Council, 1983.

Watson, William G. "It's Still Not Time for an Industrial Strategy." Canadian Public Policy. v.10, n.2 (June 1984).- pp.201-210.

Williams, Roger. "British Technology Policy." Government and Opposition. v.19, n.1 (Winter 1984). pp.30-51.

Wonnacott, R.J. "Industrial Strategy: A Canadian Substitute for Trade Liberalization." Canadian Journal of Economics. Vol.8 (1975). pp.536-547.

Wonnacott, R.J. and Paul Wonnacott. Free Trade Between the United States and Canada. Cambridge, Mass.: Harvard University Press, 1967.

Wright, Vincent. "Socialism and the Interdependent Economy: Industrial Policy-Making Under the Mitterrand Presidency."- Government and Opposition. v.19, n.3 (Summer 1984). pp.287--303.

CHAPTER TWO: TEN SITUATIONS IN SEARCH OF RECONCILIATION

Acheson, Karen and C.J. Maule. Communications Research and Development Activities in Canada. Ottawa: Department of Communications, 1983.

Babe, Robert E. Vertical Integration and Productivity in Canadian Telecommunications. Ottawa: Department of Communications, 1981.

Barker, Robert. "Bell Wringer: Bypass Threatens Regionals' Revenues." Barrons. v.65, n.22 (3 June 1985). pp.13, 23-23.

Barton, John H. "Coping With Technological Protectionism." Harvard Business Review. v.62, n.6 (November/December, 1984). pp.91-97.

Berger, S. and P. Niogi. "The U.S. Department of Justice - American Telephone and Telegraph and International Business Machines Anti-Trust Settlements: Some Canadian Considerations." Canadian Regulatory Reporter. Vol.3 ((April 1983). pp.5.1 - 5.8.

Brock, Gerald. Bypass of the Local Exchange: A Quantitative Assessment. Washington: Federal Communications Commission, 1984.

Brunt, Peter and Alan I. Naylor. "Telecommunications and Space." Futures. v.14, n.5 (October 1982). pp417-434.

Cowley, Peter F. and Jonathon D. Aronson. "The Great Satellite Shootout." Regulation. (May/June 1985). pp.27-35.

Dalfen Associates Consulting, Inc. A Study of Convergence of Domestic and International Telecommunications Service. Ottawa: 1983.

Department of Communications. New Technology Developed in the Department of Communications Could Pave Way For Two-Way TV Services in Canada. 15 August 1978.

Department of Communications. Review of Communications Policies and Practices and their Industrial Impacts. Ottawa: Department of Communications, 1981.

Department of Communications. The Electronic Office in Canada. Ottawa: Minister of Supply and Services Canada, 1982.

Department of Communications. Office Communications Systems and Services. Ottawa: Minister of Supply and Services Canada, 1982.

Chapter 2 (cont'd)

Department of Communications. Cellular Mobile Radio Policy and Call for License Applications. Canada Gazette. 2-3 October 1982.

Department of Communications. Cellular Mobile Licensing Decisions. 4 December 1983.

Department of Communications. Fox Announces That All Restrictions on Ownership of Transmit Earth Stations Will be Lifted on 1 April 1986. 14 April 1984.

Desbarats, Peter. Newspapers and Computers: An Industry in Transition. Ottawa: Minister of Supply and Services Canada, 1981.

Director of Investigation and Research Under the Combines Investigation Act. The Effects of Vertical Integration on the Telecommunications Equipment Market in Canada. Ottawa: 1976.

Donlan, Thomas G. "Killing Dead Air Time." Barrons. v.65, n.9 (4 March 1985). pp.15-16.

_____. "The Battle is Joined: IBM Goes Head-to-head With AT&T." Barrons. v.65, n.26 (1 July 1985). pp.13, 22-24.

Dotto, Lydia. "Telidon: One Tough Sale." Canadian Business. Vol.55, No.1 (January 1982). pp.88-95.

Douserv Group Inc. An Economic Analysis of Enhanced Telecommunications: Final Report. Ottawa: Department of Communications, 1983.

Goss, Gilroy and Associates Ltd. A Study of Telephone Resale and Sharing in the United States and Canada. A Report Prepared for the CRTC. Ottawa: 1984.

Hardy, S. "Satellites, Fibre Optics and Microwaves: A Cost Comparison." Telecommunications. (June 1984).

Hough, Roger W. and Associates. A Study to Forecast the Demand for Telidon Services Over the Next Ten Years. Ottawa: Department of Communications, 1980.

Hough, R.W. and Associates. A Study of Industrial Implications of Terminal Attachment in Canada. Ottawa: Department of Communications, 1981.

Hutchinson, G. "Cable TV Operators Are poised to Enter Competitive Telecom Area." Communications Systems. (Feb/March 1984).

Chapter 2 (cont'd)

ICA Telemanagement. The Interconnect Industry in Canada: 1983. Toronto: 1983.

Johnson, J. "IBM's Two-Lan Plan." Datamation. (February 1984).

Kelley, David. "Local Monopoly?" Barrons. v.65, n.36 (9 September 1985). p.9.

Knoppers, Jake V. and Prabir Neogi. Report on Public Online Information Retrieval Services. Ottawa: Department of Communications, 1982.

KVA Communications and Electronics Co. The Impact of Bypass on the Future Development of Local Telecommunication Networks: Final Report. Ottawa: Department of Communications, 1985.

Lavers, D. "The Telephone Interconnect Equipment Market: A New Revenue Stream for Cable?" Cable Communications. (June 1984).

Lesser, Barry. Alternative Market Structures For Videotex Service in Canada: The Public Policy Implications. Ottawa: Department of Communications, 1982.

Lesser, Barry and Louis Vagianos. Computer Communications and the Mass Market in Canada. Montreal: Institute for Research on Public Policy, 1985.

Lilley, Wayne. "Getting a Line on Interconnect." Canadian Business. 54 (March 1981). pp.98-108.

Litvak, I.A. and C.J. Maule. Information Technology and the Performance of Foreign Subsidiaries in Canada. Ottawa: Department of Communications, 1980.

Madden, John. Videotex in Canada: The Future Development of Public Telecommunications in Canada, 1976-1991: Project Delta. Discussion Paper #9. Montreal: Project Delta, 1979.

"Maple Multinational." The Economist. (9 February 1985). p.71.

Northern Business Intelligence Ltd. Canadian Interconnect Market. Toronto: 1983.

Ostry, Bernard. Can Canada Penetrate the European Communications Market? Discussion Paper #18. Montreal: Delta Seminar, 1981.

Peat, Marwick and Partners. Large Business Satellite Demand Study. Ottawa: Department of Communications, 1983.

Chapter 2 (cont'd)

_____. A Study of the Effects of Intermodal Competition on the Canadian Telecommunications Industry and Services. Ottawa: Department of Communications, 1983.

Price Waterhouse Associates. A Review of the Economic Implications of Canadian Transborder Data Flows. Ottawa: Department of Communications, 1981.

Restrictive Trade Practices Commission. Telecommunications in Canada: Phase I Interconnection. Ottawa: Minister of Supply and Services Canada, 1981.

Restrictive Trade Practices Commission. Telecommunications in Canada: Phase 3 Vertical Integration. Ottawa: Minister of Supply and Services Canada, 1983.

Robinson, Peter. "Telecommunications, Trade and Transborder Data Flow." Mimeo. (8 March 1985).

Ross, Alexander and Wendy Sage. "High Tech's Brightest Hopes." Canadian Business. (January 1981). pp.66-78.

Ross, Malcolm H. "Fibre-Optics Networks or Communications Satellites -- Alternatives?" In Kathleen Landis Lancaster, ed. International Communications, User Requirements and Supplier Strategies. Lexington: D.C. Heath and Co., 1982. pp.111-128.

Royal Commission on Corporate Concentration. Final Report. Ottawa: Minister of Supply and Services, 1976.

Strick, J.C. The Relevance of the U.S. Satellite Environment to the Canadian Scene. Ottawa: Department of Communications, 1983.

Tamec, Inc. Videotex Services: The Market Potential For Cable. Montreal: 1979.

Task Force on Trade in Services. Background Report. Ottawa: Department of Industry, Trade and Commerce, 1982.

Taylor, James R. "The Computerization Crisis: End of a Dream or Threshold of Opportunity?" Institute for Research on Public Policy Conference Paper, 1985.

"Telecommunications: the Global Battle." Business Week. (24 October 1983). pp.126-148.

"The Push to 'Bypass' Local Telephone Companies." Business Week. (27 August 1984). pp.90-92.

Chapter 2 (cont'd)

"The World on the Line: Telecommunications: A Survey." The Economist. 23 November 1985. pp.5-40.

The Telecommunications Forum. Response to Canada Gazette Notice on Cellular Mobile Radio Policy and Call for Licence Applications. Ottawa: January 1983.

TRU Limited. Economic and Market Analysis of Brokerage and Resale in the Telecommunications Carrier Industry. Ottawa: Department of Communications, 1985.

Uhlig, Ronald P., David J. Farber and James H. Bair. The Office of the Future: Communication and Computers. New York: North-Holland Publishing Company, 1979.

CHAPTER THREE: PUBLIC AND PRIVATE SECTOR ACTORS.

Bell Canada. Framework for the Future. Submission to the Department of Communications Telecommunications Policy Review.Ottawa: May 1984.

British Columbia Telephone Co. Submission to the Federal Telecommunications Policy Review. May 1984.

Canadian Business Equipment Manufacturers Association. Telecommunications Policy Statement. Toronto: 1984.

_____. Submission to the Information Technology Task Force. 19 October 1984.

_____. Submission to the Department of Supply and Services on Procurement and Industrial Policy. June 1985.

_____. Pre-budget Submission to the Minister of Finance. 30 December 1985.

Canadian Marconi Company. Annual Report 1984-1985.

CNCP Telecommunications. The Crisis in Canadian Telecommunications Policy and Regulation. Toronto: 1982.

_____. Telecommunications: A Core Component of Economic Growth. Submission to the Royal Commission on the Economic Union and Development Prospects for Canada. 31 November 1983.

_____. Telecommunications Policy: Riding the Waves of Change. Submission to the Department of Communications Telecommunications Policy Review. Ottawa: May 1984.

Cowpland, Micheal C.J. "Mitel: Awakening the European Telecommunications Industry." Canadian Business Review. v.10, n.2 (Summer 1983). pp.30-34.

CRTC. Annual Report 1982-83. Ottawa: 1983.

Department of Communications. Culture and Communications: Key Elements of Canada's Economic Future. Brief submitted to the Royal Commission on the Economic Union and Development Prospects for Canada. 3 November 1983.

Department of Communications. Annual Report 1983-84. Ottawa: 1984.

Department of Regional Economic Expansion. Annual Report 1984-85. Ottawa: 1985.

Chapter 3 (cont'd)

Dermer, Jerry. "Growing Canada's Threshold Technology-Producing Firms." Business Quarterly. Vol.49. No.1. (Spring 1984). pp.37-45.

Director of Investigation and Research under the Combines Investigation Act. Annual Report 1984-85. Ottawa: 1985.

Foster, Peter. "The World According to IBM." Saturday Night. (July 1984). pp.22-28.

Frazee, Roland C. Trade and Technology: It's Canada's Move. Montreal: Royal Bank of Canada, 1983.

Geac Computer Corporation Ltd. Annual Report 1985.

Government Telecommunications Agency. Annual Review and Planning Framework for Telecommunications in the Government of Canada 1984. Ottawa: Minister of Supply and Services Canada, 1985.

"IBM in the Akers' Era: Minding Everybody Else's Business." The Economist. v.295, n.7392 (4 May 1985). pp.65-68.

Lawrence, John. "Regulation and Competition: The Need for Reality Testing." Canadian Regulatory Reporter. Vol.2 (1981). pp.5.2 - 5.6.

Lilley, Wayne. "Leading-Edge Disasters." Canadian Business.- v.57, n.12 (December 1984). pp.36-42.

_____. "How to be a High-Tech Star." Canadian Business. v.58, n.6. (June 1985). pp.143-146.

Meisel, John. "'Babies and Bathwater', Or, What Goes Down the Deregulatory Drain?" In Oscar H. Gandy, ed. Proceedings of the 10th Annual Telecommunications Policy Conference. Norwood, N.J.: Ablex, 1983. pp.3-11.

_____. "Nightmares of a Worry-Wart: Some Tough Questions About Industrial Strategy for Canada." In Gottlieb, Calvin C., ed. The Information Economy: Its Implications for Canada's Industrial Strategy. Ottawa: Royal Society of Canada, 1984. pp.126-135.

Mitel Corporation. Annual Report 1983.

Murray, Grant C. "Technology, Information and Markets." In Gottlieb, op cit. pp.22-32.

Northern Telecom Limited. Submission to the Restrictive Trade Practices Commission. 17 July 1981.

Chapter 3 (cont'd)

_____. R&D Tax Policy for the Information Age. Submission to the Minister of Finance, Government of Canada, November 1984.

Northern Telecom. Annual Report 1984.

Office of the Prime Minister. Statement on Reorganization for Economic Development. 12 January 1982.

Schultz, Richard, Frank Swedlove and Katharine Swinton. The Cabinet as a Regulatory Body: The Case of the Foreign Investment Review Act. Working Paper no.6. Ottawa: Economic Council of Canada, 1980.

Science Council of Canada. Innovation in a Cold Climate: The Dilemma of Canadian Manufacturing. Ottawa: Information Canada, 1971.

_____. Planning Now for an Information Society. Ottawa: Minister of Supply and Services Canada, 1982.

Shepherd, John J. "National Strengths and International Cooperation." In Gottlieb, op cit. pp.105-111.

Spar Aerospace Limited. Annual Report 1984.

Takach, George. "Is Northern Telecom Heading South?" Saturday Night. (February 1985) pp.28-32.

Tarasofsky, Abraham. The Subsidization of Innovation Projects by the Government of Canada. Ottawa: Supply and Services Canada, 1984.

Teleglobe Canada. Annual Report 1984-85. Montreal: 1985.

Telesat Canada. Submission to the Federal Telecommunications Policy Review. May 1984.

Trillium Telephone Systems Inc. Annual Report 1985.

Tunstall, W. Brooke. "Cultural Transition at AT&T." Sloan Management Review. v.25, n.1 (Fall 1983). pp.15-26.

Vice, David. "National Sovereignty and Industrial Policy." In Gottlieb, op cit. pp.77-88.

Walker, Dean. "Conversation with Micheal Cowpland." Executive.- v.25, n.4 (April 1983). pp.26-32.

Chapter 3 (cont'd)

Wex, Samuel. Instead of FIRA: Autonomy for Canadian Subsidiaries? Montreal: Institute for Research on Public Policy, 1984.

CHAPTER FOUR: TELECOMMUNICATIONS POLICY AT THE NATIONAL LEVEL: INTERACTION WITH OTHER POLICIES AND PROGRAMS

Babe, Robert E. "Vertical Integration and Productivity: Canadian Telecommunications." Journal of Economic Issues. Vol. 15, No. 1 (March, 1981). pp.1-31.

Barton, John H. "Coping With Technological Protectionism." Harvard Business Review. v.62, n.6 (November/December, 1984). pp.91-97.

Benz, Steven F. "Trade Liberalization and the Global Service Economy." Journal of World Trade Law. v.19, n.2 (March/-April, 1985). pp.95-120.

Bernstein, Jeffrey I. "Research and Development Incentives: Evidence of Their Effectiveness." In Gottlieb, Calvin C., ed. The Information Economy: Its Implications for Canada's Industrial Strategy. Ottawa: Royal Society of Canada, 1984. pp. 289-296.

Bird, Richard. "Few Jobs in High Tech." Policy Options. v.5, n.5 (September/October, 1984). pp.23-27.

Bolen, Carrol et al. Managing Product Innovation. London: British-North America Committee, 1984.

Bollinger, Lynn, Katharine Hope and James M. Ulterback."A Review of Literature and Hypotheses on New Technology-Based-Firms." Research Policy. v.12, n.1 (February 1983). pp.1-14.

Brander, J. and B. Spencer. "International R&D Rivalry and-Industrial Strategy." Discussion Paper 518. Kingston: Queen's University, 1983.

Brecher, Irving. Canada's Competition Policy Revisited: Some New Thoughts on an Old Story. Montreal: Institute for Research On Public Policy, 1981.

Bureau of Competition Policy. The Effects of Vertical Integration the Telecommunications Equipment Market in Canada. Ottawa: 1976.

Byers, R.B. "Canadian Defence and Defence Procurement: Implications for Economic Policy." In Denis Stairs and Gilbert R. Winham, research coordinators. Selected Problems in Formulating Foreign Economic Policy. Toronto: University of Toronto Press, 1985. pp.131-195.

Canada Gazette. Notice #DGTN - 001 - 84. 9 January 1984.

Chapter 4 (cont'd)

Carstenson, Peter C. "Competition Policy for an Economically Integrated North America." Law and Contemporary Problems. v.44, n.3 (Summer 1981). pp.81-104.

Caves, Richard E. Diversification, Foreign Investment and Scale in North American Manufacturing. Ottawa: Information Canada, 1975.

Chalmers, F.J. "The Emerging Cost Structure of Canadian Firms: Some Implications for International Economic Policy." In Denis Stairs and Gilbert R. Winham, research coordinators. Selected Problems in Formulating Foreign Economic Policy. Toronto: University of Toronto Press, 1985. pp.105-129.

Clarkson, Tetrault. Review of the Federal Legal Instruments Re Telecommunications. Ottawa: Department of Communications, 1985.

Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty. Telecommunications and Canada. Ottawa: 1979.

Council of State Governments. "'Buy American' -- Is It Worth the Price?" CSG Backgrounder. April 1983.

Creery, Tim. Planning Planning: A Report to the Special Planning Advisor to the Minister of Communications. Ottawa: Department of Communications, 1982.

Daly, D.J. and S. Globerman. Tariff and Science Policies: Applications of a Model of Nationalism. Toronto: Ontario Economic Council, 1976.

Deacon, David. "Competition Policy in the Common Market: Its Links With Regional Policy." Regional Studies. v.16, n.1 (February 1982). pp.53-63.

de C. Grey, Rodney. United States Trade Policy Legislation: A Canadian View. Montreal: Institute for Research on Public Policy, 1982.

_____. Traded Computer Services: An Analysis of a Proposal for Canada/U.S.A. Agreement. Montreal: Royal Bank of Canada, 1983.

_____. "The Services Industries: A Note of Caution about the Proposal to Negotiate General Rules about Traded Services." In J. Whalley, research coordinator. Canada and the Multilateral Trading System. Toronto: University of Toronto Press, 1985. pp.21-39.

Chapter 4 (cont'd)

Department of Communications. Instant World: A Report on Telecommunications in Canada. Ottawa: Information Canada, 1971.

Department of Communications. Branching Out: Report of the Canadian Computer/Communications Task Force, Vol. I and II .Ottawa: Information Canada, 1972.

Department of Communications. Communications: Some Federal Proposals. Ottawa: 1975.

Department of Communications. Federal Background Paper on an Industrial Strategy for the Telecommunications Manufacturing Sector in Canada. Paper presented to the Federal-Provincial Conference of Communications Ministers, 16-17 October 1979.

Department of Communications, Communications Economics Branch. The Canadian Telecommunications Industry: Export Market Opportunities in the Eighties. Ottawa,1983.

Department of Communications. The Canadian Communications Sector: An Environmental Assessment. Ottawa: 1983.

Department of Communications. "A first in Canada-Quebec relations: Signing of agreement on communications enterprises development." News Release. 1 February 1985.

Department of External Affairs. Computing Products for World Markets. Ottawa: Minister of Supply and Services Canada.

Department of External Affairs. Production Sharing Guide book: Canada/United States Defence Production Sharing Program.- Ottawa: n.d.

Department of External Affairs. Canadian Trade Policy for the 1980's: A Discussion Paper. Ottawa: 1983.

Department of External Affairs. Competitiveness and Security. Ottawa: 1985.

Department of External Affairs. Telecommunications Trade: The Competition For Networks. Discussion Paper. Ottawa: June 1985.

Department of External Affairs. "Canada-United States Trade Negotiations." News Release. 26 September 1985.

Department of Industry, Trade and Commerce. Framework for Implementing the Government's New Industry Development Policy During the Next Four Years and Proposals for Immediate Action. Ottawa: 3 July 1980.

Chapter 4 (cont'd)

Department of Regional Industrial Expansion. A Study of Job Creation in Canada 1974-1982. Ottawa: 1985.

Department of Regional Industrial Expansion. "Canada's Industrial Adjustment: Federal Government Policies and Programs." In J. Whalley, research coordinator. Domestic Policies and the International Economic Environment. Toronto: University of Toronto Press, 1985. pp.215-242.

Dodge, David. "Changing Skill Requirements and Training Needs Arising From Technological Change." In Gottlieb, op cit. pp. 187-202.

Economic Council of Canada. The Bottom Line: Technology, Trade, and Income Growth. Ottawa: Minister of Supply and Services, 1983.

Eden, Lorraine. "Vertically Integrated Multinationals: A Microeconomic Analysis." Canadian Journal of Economics.Vol-.11 (August 1978). pp. 534-546.

Employment and Immigration Canada. Canadian Jobs Strategy.-Ottawa: June 1985.

English, H.E. " 'National Policy' and Canadian Trade." International Perspectives. (March/April 1984). pp.3-5.

European Community Information Service."E.C. Hands Trade-Barriers list to U.S."European Community News.18 December1985.

Ewing, E.F."Why Freer Trade in Services is in the Interest of Developing Countries." Journal of World Trade Law. v.19, n.2 (March/April, 1985). pp.147-169.

Exchange of Correspondence Between U.S. Senate Democratic Working Group on Trade Policy and United States Trade Representatives. 2 July 1985 and 23 October 1985.

Federal-Provincial Working Group on Competition/Industrial Policy. Interim Report. October 1979.

Federal-Provincial Working Group on the Industrial Impacts of Communications Policy. Final Report. September 1981.

Fox, Francis. Statement to the House of Commons Standing Committee on Communications and Culture, 26 May 1983.pp.6-7.

George, Roy. Targeting High-Growth Industry. Montreal: Institute for Research on Public Policy.

Chapter 4 (cont'd)

Globerman, S. "Foreign Direct Investment and 'Spillover' Efficiency Benefits in Canadian Manufacturing Industries." Canadian Journal of Economics. Vol.12 (1979).pp.42-50.

Globerman, Steven and James Diodati. "Market Structure, Internal Organization, and R&D Performance in the Telecommunications Industry." Quarterly Review of Economics and Business. Vol.20, No.4 (Winter 1980). pp.70-85.

Globerman, Steven and Lindsay Meredith. "The Foreign Ownership-Innovation Nexus in Canada." Columbia Journal of World Business. v.19, n.4 (Winter 1984). pp.53-61.

Goodman, Gary A. and Robert M. Saunders. "US Federal Regulation-of Foreign Involvement in Aviation, Government Procurement and National Security." Journal of World Trade Law. v.19,n.1 (January/February, 1985). pp.54-61.

Gorecki, Paul K. and W.T. Stanbury. The Objectives of Canadian Competition Policy, 1888-1983. Montreal: Institute for Research on Public Policy, 1984.

Government of Canada. Proposals for a Communications Policy for Canada. Ottawa: 1973a.

Government of Canada. Proposals for a Computer/Communications Policy for Canada. Ottawa: 1973b.

Government of Canada. Communications: Some Federal Proposals. Ottawa: 1975.

Government of Canada. Economic Development for Canada in the 1980's. November 1981.

Governments of Canada and Manitoba. Subsidiary Agreement on Communications and Cultural Enterprises. 11 June 1984.

Governments of Canada and the Provinces. Regional Economic Development: Intergovernmental Position Paper. Ottawa: June 1985.

Governments of Canada and Quebec. Canada-Quebec Subsidiary Agreement on Communications Enterprises Development. 1 February 1985.

Green, C. "Canadian Competition Policy At A Crossroads." Canadian Public Policy. v.7, n.3 (Summer 1981). pp.418-432.

Chapter 4 (cont'd)

Hamilton, Colleen and John Whalley. "Non-Tariff Barriers to Canadian Trade Policy: Summary of the Proceedings of a Research Symposium." In J. Whalley, research coordinator. Canada and the Multilateral Trading System. Toronto: University of Toronto Press, 1985. pp.41-56.

Harris, Richard G. and David Cox. Trade, Industrial Policy, and Canadian Manufacturing. Toronto: Ontario Economic Council, 1983.

Hay, Keith A.J."Can Canada Sustain a High-Tech Industry." Business Quarterly. v.49, n.3 (Fall 1984). pp.52-59.

Hufbauer, Gary C. and Andrew J. Samet. "U.S. Response to Canadian Initiatives for Sectoral Trade Liberalization 1983-84." In Denis Stairs and Gilbert R. Winham, research coordinators. The Politics of Canada's Economic Relationship With the United States. Toronto: University of Toronto Press, 1985. pp.179-205.

Hunter, Lawson. "The Relationship Between Trade Policy and Competition Policy." Notes for and Address to University of Ottawa Conference on Canada and International Trade, 3 May 1985.

Investment Canada.The Spirit of Enterprise.Ottawa:1985.

Janisch, Hudson, Charles Dalfen and Richard Schultz. "Regulatory Responses: A Discussion." In Gottlieb, op cit. pp. 273--285.

Kotowitz, Yehuda. Positive Industrial Policy: The Implications for R&D. Toronto: Ontario Economic Council, 1985.

Lazar, Fred. The New Protectionism: Non-Tariff Barriers and Their Effects on Canada. Ottawa: Canadian Institute for Economic Policy, 1981.

LeRoy, Donald J,. and Paul Dufour. Partners in Industrial Strategy: The Special Role of the Provincial Research Organizations. Ottawa: Minister of Supply and Services, 1983.

Lesser, Barry. "Regional Requirements for the Information Economy and Canadian Industrial Strategy." In Gottlieb, op cit. pp. 305-313.

Litvak, I.A. and C.J. Maule. "Canadian Outward Investment." Journal of World Trade Law. v.14, n.4 (July/August 1980).pp-.310-328.

Chapter 4 (cont'd)

Longo, Frank. Industrial R&D and Productivity in Canada. Ottawa: Science Council of Canada, 1984.

Loveland, Norman C. "Scientific Research Tax Credit and Share Purchase Tax Credit Investments -- A Legal Perspective." Canadian Tax Journal. v.32, n.4 (July/August 1984). pp.706--726.

Mackenzie, Kenneth C. Tariff-Making and Trade Policy in the U.S. and Canada. New York: Praeger, 1968.

Mansfield, Edwin and Lorne Switzer. "How Effective are Canada's Direct Tax Incentives for R&D?" Canadian Public Policy.- v.11, n.2 (June 1985). pp.241-246.

Masse, Hon. Marcel. looking at Telecommunications -- The Need for Review. Speech to the Electrical and Electronic Manufacturers' Association of Canada. 20 June 1985.

McFetridge, D.G. Government Support of Scientific Research and Development: An Economic Analysis. Toronto: University of Toronto Press, 1977.

McFetridge, D.G., and J.P. Warda. Canadian R&D Incentive: Their Adequacy and Impact. Canadian Tax Paper no. 70. Toronto: Canadian Tax Foundation, 1983.

Meaney, George. "Aggregate Employment." In Gottlieb, op cit. pp.150-161.

Minister of Communications. An Act Respecting Communications in Canada, Bill C-24. 26 January 1978.

Ministry of State for Science and Technology. Canadian Trade in High-Technology: An Analysis of Issues and Prospects. Discussion Paper. Ottawa: August 1985.

Northern Business Information Inc. Northern Telecom: A Strategic Analysis. New York: 1984.

Ontario Task Force on Employment and New Technology. Employment and New Technology. Toronto: 1985.

Organisation for Economic Cooperation and Development. Information Activities, Electronics and Telecommunications Technologies: Impact on Employment, Growth and Trade. Paris: OECD, 1982.

"Ottawa's Secret Agenda For Telecom Competition." The Telemanagement Report. Vol.3, No.8 (October 1985). pp.87-97.

Chapter 4 (cont'd)

Palda, K.S. and B. Pazderka. Approaches to an International Comparison of Canada's R&D Expenditures. Study prepared for the Economic Council of Canada. Ottawa: Minister of Supply and Services Canada, 1982.

Peitchinis, Stephen. The Employment Implications of Computers and Telecommunications Technology. Ottawa: Department of Communications, 1981.

_____. "Employment in the Evolving Information Economy." In Gottlieb, op cit. pp.33-49.

Pine, Madsen. Dismantling the State: The Theory and Practice of Privatization. Dallas, Texas: National Center for Policy Analysis, 1985.

Poynter, T.A., and A. Rugman. "World Product Mandates: How Will Multinationals Respond?" Business Quarterly. (Fall 1982).

Price Waterhouse Associates. Towards a Policy Framework for the Economic Development of the Communications/Information Sector. Ottawa: Department of Communications, 1981.

_____. Environmental Assessment of the Telecommunications Equipment and Informatics Sector in Canada. Ottawa: Department of Communications, 1985.

Prichard, J. Robert S., W.T. Stanbury, and Thomas A. Wilson, eds. Canadian Competition Policy: Essays in Law and Economics. Toronto: Butterworths, 1979.

Privy Council Office. Two Further Steps in the Regulatory Reform Strategy. 13 March 1986.

Protheroe, David R. Imports and Politics: Trade Decision-Making in Canada, 1968-1979. Montreal: Institute for Research on Public Policy, 1980.

Quinn, John and Philip Slayton, eds. Non-Tariff Barriers After the Tokyo Round. Montreal: Institute for Research on Public Policy, 1982.

Renaud, Andre. "Event Insurance and Financing in Canada." in J. Whalley, research coordinator. Domestic Policies and the International Economic Environment. Toronto: University of Toronto Press, 1985. pp.111-149.

Robinson, Peter. "Sovereignty and Data: Some Perspectives." In Gottlieb, op cit. pp. 331-334.

Chapter 4 (cont'd)

Ronayne, Jarlath. Science in Government. London: Edward Arnold, 1984.

Rostow, W.W. "Technology and Unemployment in the Western World." Challenge. v.26, n.1 (March/April 1983). pp.6-17.

Rugman, A., and J. Bennett. "Technology Transfer and World Product Mandating." Columbia Journal of World Business. (Winter 1982). pp.58-62.

Safarian, A.E. "Foreign Ownership and Industrial Behaviour: A Comment on 'The Weakest Link.'" Canadian Public Policy.- Vol.5 (Summer 1979). pp.318-335.

_____. Governments and Multinationals: Policies in the Developed Countries. Washington, D.C.: British-North America Committee, 1983.

Sangster, Derwin. "Employment Impacts of Technologies -- Some Early Indications From the Canadian Occupational Projection System Work." In Gottlieb, op cit. pp. 157-161.

Sapir, Andre. "Trade in Services: Policy Issues for the Eighties." Columbia Journal of world Business. v.17, n.3 (Fall 1982). pp.77-83.

Sarna, A.J. "Directions of Canada's Policy on World Product Mandates." Canadian Business Review. v.11, n.4 (Winter 1984). pp.35-38.

Science Council of Canada. Background Material of R&D Support Mechanisms and Technological Inniovation in Canada. Ottawa: 1985.

Smith, Stuart L. "Canada and the Changing Pattern of World Trade." In Gottlieb, op cit. pp.10-14.

Spero, Joan. "Information and Telecommunications as a Trade Issue." Intermedia. Vol.10 (March 1982). pp.9-11.

_____. The Politics of International Economic Relations. New York: St. Martin's Press, 1985.

Stairs, Dennis and Gilbert R. Winham. Selected Problems in Formulating Foreign Economic Policy. Toronto: University of Toronto Press, 1985.

Stoffman, Daniel. "Arm in Arm." Canadian Business. v.57, n.1 (January 1984). pp.40-46.

Chapter 4 (cont'd)

Stone, Frank. Canada, the GATT and the International Trade System. Montreal: Institute for Research on Public Policy, 1984.

Supply and Services Canada. An Annual Procurement Plan and Strategy, 1984-85. Ottawa: 1984.

Swords-Isherwood, Nuala. The Process of Innovation. London: British-North America Committee, 1984.

Task Force of Technology Development. Report of the Task Force on Federal Policies and Programs for Technology Development. Ottawa: 1984.

Tomaskovic-Devey, Donald and S.M. Miller. "Can High-Tech Provide the Jobs?" Challenge. v.26, n.2 (May/June 1983).-pp.57-63.

Tsurumi, Yoshi. Sogoshosha: Engines of Export-Based Growth. Montreal: Institute for Research on Public Policy, 1984.

Valaskakis, Kimon and Peter S. Sindell. Industrial Strategy and the Information Economy: Towards a Game Plan for Canada. Ottawa: Department of Communications, 1980.

Whalley, John. Canada and the Multilateral Trading System. Toronto: University of Toronto Press, 1985.

_____, research coordinator. Canada-United States Free Trade. Toronto: University of Toronto Press, 1985.

_____, C. Hamilton and R. Hill. Canadian Trade Policies and the World Economy. Toronto: University of Toronto Press, 1985.

Whitley, J.D. and R.A. Wilson. "Quantifying the Employment Effects of Microelectronics." Futures. v.14, n.6 (December 1982). pp.486-495.

Williams, Charles M. "The Information Economy: Its Implications for Canada's Industrial Strategy." In Gottlieb, op cit. pp. 366-72.

Williams, Glen. Not For Export: Towards a Political Economy of Canada's Arrested Industrialization. Toronto: McClelland and Stewart, 1983.

Zeman, Z.P. The Impact of Computer Communications on Employment in Canada: An Overview of Current OECD Debates. Ottawa: Department of Communications, 1979.

Chapter 4 (cont'd)

_____. "Technological Unemployment: The Context and Nature of the Debate." In Gottlieb, op cit. pp.187-202.

Zohar, Uri. Canadian Manufacturing: A Study in Productivity and Technological Change. Vols. I and II. Ottawa: Canadian Institute for Economic Policy, 1982.

CHAPTER FIVE: POLICY INSTRUMENTS

Delli Carpini, Micheal and Indu B. Singh. "Telematics and the Political Process." Telematics and Infomatics. v.1, n.3 (1984). pp.281-295.

Doern, G. Bruce, ed. The Regulatory Process in Canada. Toronto: Macmillan of Canada, 1978.

_____. "Regulatory Processes and Regulatory Agencies." In G. Bruce Doern and Peter Aucoin, ed. Public Policy in Canada: Organization, Process and Management. Toronto: Macmillan Company of Canada, 1979.

Economic Council of Canada. Government Enterprise: Roles and Rationale. Papers Presented at a Symposium Held in Ottawa, September 1984.

Floyd, Robert H., Clive S. Gray, and R.P. Short. Public Enterprise in Mixed Economies: Some Macroeconomic Effects. Washington, D.C.: International Monetary Fund, 1984.

Halal, William E. "Beyond Left versus Right: Evolution of Political Economy in an Information Age." Futures. v.17, n.3 (June 1985). pp.202-213.

Kantrow, Alan M.,ed. "The Political Realities of Industrial Policy." Harvard Business Review. v.61, n.5 (September/October 1983). pp.76-86.

Laux, Jeanne Kirk. "Public Enterprises and Canadian Foreign Economic Policy." Publius. v.14, n.4 (Fall 1984). pp.61-80.

Melody, William H. "Competition and Subsidies as Instruments of Social Policy in Telecommunications." In MSU Public Utilities Papers, 1981. East Lansing, Michigan: Institute of Public Utilities, 1981. pp.75-93.

Ministry of State for Science and Technology. Federal Government Incentives for Industrial R&D. Ottawa: January 1982.

Prichard, J. Robert S. Crown Corporations in Canada. Toronto: Butterworths, 1983.

Prichard, J. Robert S. and Micheal J. Trebilcock. "Crown Corporations in Canada: The Choice of Instrument." In M.A. Atkinson and M.A. Chandler, eds. The Politics of Canadian Public Policy. Toronto: University of Toronto Press, 1983.

Quinn, John and M.J. Trebilcock. "Compensation, Transition Costs, and Regulatory Change." University of Toronto Law Journal.
v.32, n.2 (Spring 1982). pp.117-175.

Chapter 5 (cont'd)

Stanbury, W.T. and Fred Thompson. "The Prospects for Regulatory Reform in Canada: Political Models and the American Experience." Osgoode Hall Law Journal. Vol.20 (December 1982). pp.680-718.

Stanbury, W.T. and George Lerner. "Regulation and the Redistribution of Income and Wealth." Canadian Public Administration. (Fall 1983).

Tupper, Allan. Public Money in the Private Sector. Kingston: Institute for Intergovernmental Relations, 1982.

Tupper, Allan and G. Bruce Doern, eds. Public Corporations and Public Policy in Canada. Montreal: Institute for Research on Public Policy, 1981.

Usher, D. "The Benefits and Costs of Firm Specific Investment Grants: A Study of Five Federal Programs." Mimeo. Kingston: Queen's University, 1982.

Williams, James R. The Canadian-United States Tariff and Canadian Industry: A Multisectoral Analysis. Toronto: University of Toronto Press, 1978.

Woodside, Kenneth. "The Political Economy of Policy Instruments: Tax Expenditures and Subsidies in Canada." In Chandler and Atkinson, op cit. pp.173-197.1

WOODROW, BRIAN R.
--Reconciling increased competition to industrial policy in the Canadian telecommunications sector