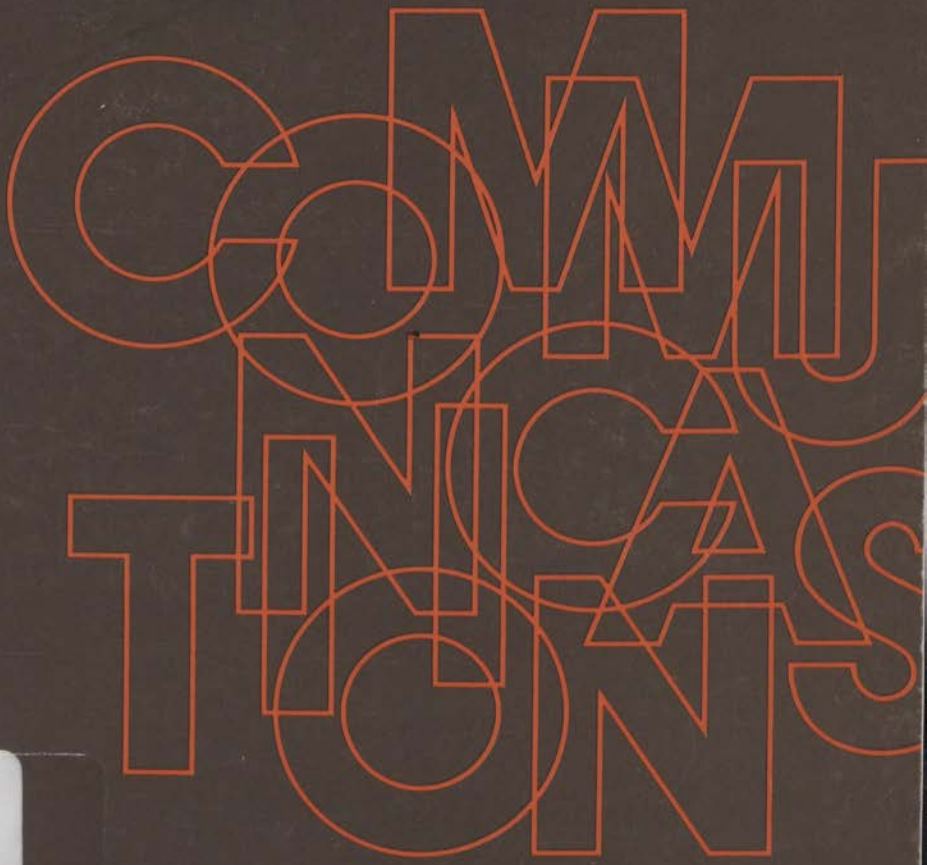
1978
Report of the Communications Research Advisory Board



Government of Canada
Department of Communications

Gouvernement du Canada
Ministère des Communications

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A publication of the Department of Communications

Preface

The Communications Research Advisory Board (CRAB) was appointed in 1974 to advise on the research program of the federal Department of Communications. Its members, experts in the field of communications, are appointed by the Department for terms not normally exceeding three years.

The mandate of the Board is to advise the Department of Communications on the quality, management, and relevance of its research program to departmental goals. It also recommends measures to improve co-ordination with similar programs in industry, universities, and elsewhere in government, and offers advice on matters specifically referred to it by the Department.

August 24, 1978

Mr. Bernard Ostry
Deputy Minister
Department of Communications
Ottawa, Ontario

Dear Mr. Ostry:

On behalf of the members of the Communications Research Advisory Board, I am pleased to submit herewith the report of our Board for 1978.

As mentioned at the conclusion of our report, we have felt privileged to work with your Department at this time of unprecedented communications development. The questions which were referred to our particular attention were challenging ones and we hope that our recommendations will prove useful to you and to your colleagues.

I am sure I speak for all members of CRAB in thanking you for the personal interest you have taken in our work. I remain, of course, at your disposal should you require further information regarding our recommendations.

Sincerely,

Alphonse Ouimet

Alphonse Ouimet
Chairman
Communications Research
Advisory Board

Introduction

The 1978 meetings of CRAB took place on April 5 and 6 and again on May 10 and 11. The theme of technology transfer to industry had been designated by the Department, and a number of technical topics — notably new home and business services and space — had been selected for detailed discussion.

Officers of the Department of Communications (DOC) gave freely of their time in open, friendly, and purposeful discussions. This was greatly appreciated by all members of the Board, who also wish to register their particular appreciation for the active and very candid participation of the Deputy Minister of Communications.

This report is mainly about the theme and topics selected by the Department. It goes further, however, and deals with other points which the Board itself felt to be pertinent. It was prepared by a committee established by CRAB for this purpose, and is intended to reflect the views of the Board as a whole.

During our discussions with officers of the Department and with the Deputy Minister, there seemed to be full agreement on three major points:

1. A clearer policy framework is needed for the Department to achieve its primary role of fostering "the orderly development and operation of communications for Canada in the domestic and international spheres".

2. The Department should more forcefully direct its resources and institutional clout to foster the further development of the domestic communications industry in Canada.

3. The activities of the Department should be organized and conducted with still closer integration of the natural and human sciences sectors to ensure that technological and social development are fostered in harmony. There also appears to be a need for better internal communications and cohesion within the sectors themselves.

These and other points will be discussed in subsequent sections of this report.

Briefings

In our previous reports we have stressed how important the departmental briefings and presentations were to the work and usefulness of the Board. This year particularly, because so many of our members were new, we believe we could actually have saved time and effort had we been given a full overview of the Department, its activities, policies and plans, right at the beginning of our deliberations.

To facilitate and expedite the work of the Board in future years we therefore reiterate the recommendation that
— a "Here's DOC" briefing, together with a briefing on DOC's research program, be carefully prepared and sent to the members of CRAB well before its 1979 meetings.

and add the suggestion that
— since all specialized presentations have to be carefully prepared in writing anyway, complete with charts, they should similarly be sent to CRAB members before the meetings. Were this done, the presentations could be shortened and more time devoted with the Department's specialists to a joint examination of the problems already referred to the Board.

Departmental mandate and objectives of the research program

In its deliberations the Board encountered great difficulty in identifying a specific focus or common denominator to evaluate the DOC Research Program.

It quickly became clear to members of the Board (and indeed the Deputy Minister indicated his concurrence) that it is time for stock-taking and direction-setting in the Department. By this we mean that the Department should identify the key issues it is facing, and the objectives of its research program should flow from this set of priorities.

In the view of the Board, DOC's prime concern is with the purveyors of communications, not the purveyors of hardware. Hence its prime role is to provide leadership in the formulation of a coherent national communication strategy.

The Board expressed concern that, with the blurring of boundaries between various forms of telecommunications, policies seem to have been established on an ad hoc basis, mainly by lawyers, in a legalistic and regulatory framework. DOC still has a unique opportunity for developing a more comprehensive policy framework, taking into account technological trends as well as socio-economic and cultural considerations. It would be within this general policy framework that regulatory agencies could ensure that the daily activity of the communications industry would best serve the present and future needs of the nation.

Members of CRAB voiced the opinion that one of the most significant contributions the Department could make towards the orderly development of communications in Canada would be to take the lead in creating an *ambiance* within which there can be new development by broadcasters and carriers unfettered by many of the current but obsolete institutional obstacles. This approach avoids the "technology push" problem, where research on new products or services might be carried out without a sufficient appreciation for whether or not such products and services are commercially viable.

Concentration by DOC on the formulation of a communications policy framework would make other DOC activities fall into place more neatly. Research, both technical and socio-economic, should in the first instance be undertaken in support of the Department's prime mandate. Its execution would continue to serve other purposes, and to meet other objectives such as technology transfer and industrial development.

Within this context we wish to be clear that we consider the Research Program of the Department to be of vital importance. It should continue to be the primary source of socio-technical advice to the Government of Canada in matters bearing on communications. It should continue to represent core technical competence as a national resource. It should carry out or foster the carrying out of research aimed at the problems of today, tomorrow, and the long-range future in the socio-technical field of communications.

Similarly, one of the most lasting and valuable contributions which DOC can make to industrial development is to create for the communications industry a policy environment that optimizes the communications services available to Canadians and also enables Canadian companies to take advantage of opportunities offered by market aggregation resulting from a national communications strategy.

Policy, planning and research

Having noted the importance we attach to the policy and planning function of DOC, we are concerned that the present organization of the Department perpetuates the historical isolation between the "technocrats" and the "econocrats", as economists and social scientists have been called. The input to the research program can be said to divide into the human sciences and the natural sciences. This is just a definitional distinction, but it also reflects the very real separation appearing in the DOC organization.

Several years ago the Department began to bring these disciplines closer together within specific research activities. This was a step in the right direction, but even closer integration is warranted, particularly as the social and cultural implications of technology should, we believe, receive increased priority in the research program. This will help to provide an improved balance between "technology push" and "requirements pull". At the same time the Department should increase the relative emphasis given to social research (that is, human factors versus pure economics research and analysis).

We therefore recommend that consideration be given to ways in which the policy and planning function can become even more closely integrated with the research program in terms of both organization and personnel.

Technology transfer

As a mechanism for fostering industrial innovation in Canada, technology transfer has been receiving increased attention in Government circles in recent months. In this year's briefings the Department showed that it is clearly committed to this concept and that it is aware of the many impediments that can be encountered before commercial success results.

We endorse the positive intentions expressed by the Department with respect to the objectives of technology transfer. We wish to underline, however, that this is an important means but not an end in itself. The circumstances and attitudes surrounding technology transfer mark the difference between good intentions and practical results. Specifically it should be recognized that

1. Exciting new developments created by research personnel in Government laboratories are only valuable to Canada if a suitable entrepreneur can be identified who has the resources and willingness to assume the very large risks involved in carrying the develop-

ment to the stage where there is a product or service available on the marketplace. The lack of innovation in Canada is due more to the lack of competent and effectively supported entrepreneurs than it is to any lack of good ideas on which to base innovation.

2. Since any new product requires continuing research and development to maintain a competitive position, the most effective way to transfer technology is to transfer personnel to the company.

3. The start-up period for a new high-technology company is at least five years. So a new company should not be considered as having established itself until it has survived for a minimum of five years.

4. Realistic cash-flow predictions for new high-technology companies show very clearly that such companies are not suitable investments for other than venture capital companies with adequate resources and nerve. It is incumbent on Government agencies to encourage the supply of the needed venture capital.

5. The NRC Program for Industry/Laboratory Projects (PILP) is one model for collaboration with industry, and it is unique in that it contractually specifies collaborative activities between the laboratory and the company. There is some reason for suspecting that the success of the PILP program may be due mostly to the fact that the direct involvement of the National Research Council in the project leads to NRC's taking a more active role in the financial affairs of the company than it might otherwise do.

6. In its collaboration with industry the Department should have no hesitation about adopting a "chosen instrument" policy as part of a program to develop strong domestic participation in the field of telecommunications.

7. It should be clearly recognized that technology transfer is no substitute for the encouragement of entrepreneurs who are promoting their own ideas, since technology transfer will only be effective if there already exists an environment which is sympathetic to their activities. It is not commonly recognized that there is available a huge surplus of excellent ideas on which innovations could be based. It is entrepreneurs who are short supply, and this is why it is essential that entrepreneurs be encouraged in Canada.

8. We should not lose sight of the fact that nine times out of ten, R&D activities do not result in a marketable product. If we are expecting a success ratio higher than that we then have unrealistic expectations.

Industrial strategy

This year's briefings and discussions, having emphasized technology transfer and the industrial impact of the Department's programs, have made it clear that industrial strategy is a closely related policy issue which must be addressed.

The present written goals of the Department do not explicitly reflect the stress now being put on industrial strategy. That industrial policy is the responsibility of another department of Government and that numerous other departments have similar concerns pose a dilemma to DOC in pursuing the formulation of policy in this area. This problem was reflected in one of the departmental papers, as it was in questions posed in a number of briefings.

In view of the current industrial situation in Canada it is recommended that the Department continue to take a strong stand in promoting elements of an industrial strategy pertinent to Departmental interests. It is appropriate for DOC to seek to strengthen existing companies and encourage the formation of new companies. And as new knowledge of how industry functions will be required before useful new policies can be produced, it is likewise appropriate for the Department to sponsor studies in this area as related to the needs of the telecommunications industry in Canada.

The members of CRAB endorse policies leading to increased emphasis on co-operation between the Department and industry, including specifically the following:

1. Incorporating in the Department's objectives that DOC, in concert with other departments and agencies, will actively seek the development of an industrial policy aimed at the creation and development of a strong domestically owned telecommunications industry in Canada.

2. Assigning to each division of the Department the explicit objective of maximizing the use of the Department's resources in attaining the above goals and assessing divisions against this objective.

3. The strategies adopted by each division should take account of the following factors, among others, as appropriate:

i) optimizing technology transfer from the Department's laboratories to industry (see below).

ii) conducting its R&D in co-operation with industry as much as possible.

iii) improving the flexibility of its contracting-out policy by recognizing that the optimum benefits result if the project is initiated with industry in the first place.

iv) recognizing the need to award sole-source contracts to promising domestically owned companies, in order to bring them to the point where they can be internationally competitive. The start-up period for high-technology companies is of the order of five to ten years, so new companies should not be subjected to excessive international competition during this period.

v) influencing other departments and agencies to adopt similar policies, by showing that the long-term tangible benefits from supporting domestically owned companies can frequently far outweigh the apparent increased costs.

4. Considering an increase in its contracting-out activities by including the management of major research facilities, such as the David Florida Laboratory.

5. The Department should play an active role in assisting domestically owned companies with their marketing operations, especially in international markets, by showing it is a satisfied customer for the products and services of the company.

6. Developing factual evidence in support of a strong "Buy Canadian" policy, which should be given high priority.

7. Maximizing the use of existing telecommunications networks. The magnitude of investment ($15 billion) suggests that one should look carefully at the utilization of these networks. The local telephone distribution network at three per cent average utilization is a good example of capacity which could be made available for additional uses.

Elements of DOC research program

New home and business services

We were impressed by the exciting work being done with relatively limited resources at Shirley Bay on the technology of new home and business services. The demonstrations we have seen indicate that the videotex system developed at the Communications Research Centre is a definite improvement over those which are under intensive experimentation in many other countries, particularly in Europe.

So far, there seems to have been less interest in the United States. It could thus be possible for Canada to take the North American lead in that field, with all this could imply for Canadian industry.

We therefore urge the Department to press on with this objective in mind. There are also other initiatives which the Department should take to stimulate a parallel Canadian development of the extensive software resources which will be needed for teletext and viewdata-like operations. There are already a number of information bank multinationals in different stages of development and there is no doubt that we will want to have full access to them. At the same time, as in the case of hardware, we must make sure that foreign interests do not in effect control the Canadian information software market.

Field trials and fibre optics

This subject received a great deal of discussion, stimulated in part by the briefings and in part by the public knowledge of the proposed field trials in Manitoba and Alberta. The focus of the discussions was on the importance of field trials and particularly of large-scale testing of technology and services holding promise for economic and social development.

Field trials should be more than dress rehearsals of some new product or service. They are expensive and we should capitalize on them. Indigenous technological development in Canada will be advanced by avoiding the purchase of major components off-shore on the basis of expediency. We note, for example, that field trials using fibre optics cost many millions of dollars and that the domestic market will likely become substantial for related hardware. Hence, a condition of public moneys being provided should be that no off-shore purchases be allowed, unless to buy in Canada would be a major disadvantage. It should have to be shown that it would be in the long-term interests of the country not to create an appropriate capability in Canada if one does not already exist.

In other words, field trials should be clearly "Buy Canadian". It might cost more at the outset, but the capability and capacity for meeting the Canadian market will be established in this way.

We note, for example, that contrary to what we were told during the briefings, as matters now stand the bulk of the optical fibre and associated technology for the Manitoba and Alberta field trials might be purchased from the United States. Yet the combined requirements would be a good initial market for Canadian industry given a further commitment for favoured access to the Canadian market as it develops.

This is a particularly important consideration because, at present, Canada is on the verge of moving from a telecommunications distribution system based predominantly on copper wire and cable, of which Canada supplies virtually all of its own requirements, to an industry which will most likely be predominantly glass fibre. Thus, unless Canada can quickly ensure a competitive position in the emerging fibre optics industry, a large segment of our already rapidly decreasing electronics and telecommunications industry is likely to be lost. The situation can be compared to the recent transition from the technology of vacuum tubes, of which Canada was a major producer, to transistors, of which Canada produces virtually none.

To ensure that Canada gets at least a fair share of this fibre optics industry, we should be developing design and production expertise immediately. Here is one area where virtually 100 per cent Canadian content would be desirable, and where much less could be irresponsible.

In our discussion of the subject of field trials, we began to wonder whether the Government Telecommunications Agency (GTA) network could be used for experimental purposes. It seemed to us that the Department of Communications, if it is not already doing so, could consider how to take advantage of the very extensive GTA facilities to conduct certain kinds of large-scale field trials. The foregoing considerations would continue to apply and, in particular, such experiments would only be conducted with the fullest co-operation of GTA's clients, and the carriers and Canadian manufacturers.

Space program

Figures presented in the course of the briefings on the Space Program showed a relatively low level of participation in the domestic space program by the Canadian industry. This led to comments on the need to increase our export efforts, to a discussion of the possible emergence of a Canadian prime contractor in the communications satellite program, and to institutional and other difficulties which might impede such a process. The wisdom of proceeding with a relatively high level of space research funding, in the absence of the rapid evolution of Canadian prime-contractor capabilities, was also questioned.

The following questions should be addressed to focus these issues:

1. What is the level of market, domestic and export, deemed to be adequate to justify a Canadian prime contractor in satellite activity?

2. Can and should the Canadian domestic space program lead to the establishment of a Canadian-controlled prime contractor for communications and other satellites, taking into account existing institutional circumstances?

3. If a Canadian prime contractor cannot be established at an early date, is the level of research funding currently committed to the research program warranted?

4. In the light of the changing focus of the domestic space program, should the lead agency responsibility for the program be centred elsewhere than DOC?

In the opinion of CRAB, the resolution of these questions is prerequisite to any assessment of the size and scope of our satellite research activities, and to their organizational modalities. It is therefore urged that an intensive attempt at resolution be made at an early date.

These questions are prompted in part by the fact that the space component dominates the research budget. While the reason for this imbalance is understood, it is not at all clear that the budgetary allocations reflect departmental priorities.

Conclusion

Our comments in this report have ranged from global statements about industrial strategy to specific suggestions about ways the Department could help CRAB serve its purpose better. There is little more to add than to say we feel privileged to work with the Department at this time of unprecedented communications development. Never has "the orderly development and operation of communicacations for Canada" presented the Department with greater scope and challenge. In our discussions with senior management, we were impressed by its awareness of what lies ahead, and by its determination to provide the leadership, planning and broad policies necessary to guide Canada's smooth passage into the "information society".

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