Report on the Mandates and Work Programs
of Seven Designated Canadian Standards Organizations

Prepared for the Department of Communications
working in close co-ordination with
The Telecommunications Standards Advisory Council of Canada

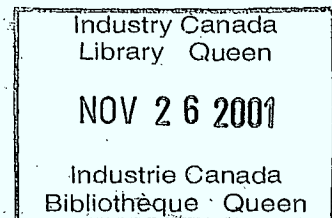Liora Salter
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January 1993

Canada

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Executive Summary

The Mandates and Work Programs of Seven Designated Standards Organizations

Introduction:

This study was commissioned by the Department of Communications, working in close co-operation with the Telecommunications Standards Advisory Council of Canada, a non-governmental body with membership from the standards organizations and their primary industry and government participants.

Its purpose is (1) to examine the mandates and work programs of seven designated Canadian standards organizations in terms of their contribution to appropriate Canadian telecommunications strategies; (2) to explore the interrelationship of the work programs especially to determine if gaps or convergence exist and (3) to identify barriers and opportunities for the development of appropriate telecommunication strategies. The study was conducted by a review of documents and interviews with members of TSACC. The assessment and recommendations are the sole responsibility of its author.

Overview:

The report first describes the standards environment within which the Canadian standards organizations function, including the many international, regional, "upstream" and "downstream" organizations and committees involved. It indicates that there may be as many as eleven "layers", with some groups active in more than one "layer". There are also many organizations for which "upstream" contributions from Canada would be useful.

The report then describes and assesses the mandates, participation and work programs of seven designated Canadian standards organizations: CSA/SCIT, CSA/SCOT, TAPAC, RABC, CNO/CCITT, CNO/CCIR and CIGOS. The organizations are very different from each other, and their work programs are not easily co-ordinated in part because they are responsive to decisions often made in an international rather than domestic context. The problems facing each organization are identified.

The report then comments on "the facts of life", the basic conditions shaping both the Canadian standards environment and the work programs of the standards organizations. These "facts" involve (1) the membership in Canadian standards organizations, (2) the types of organizations involved (3) the complexity of the standards community, (3) the relationship of the parent organizations, CSA, SCC and the Department of Communications, to the Canadian IT&T standards organizations, (4) the problems inherent in the "upstream and "downstream" roles played by Canadian IT&T standards organizations and (5) the issue of whether and how "made in Canada standards should be developed.

Assessment:

An overview of the assessment contained in the report is as follows

(a) work programs never developed in a vacuum:

The work programs of the designated Canadian standards organizations are not developed in a vacuum, but respond very directly to the needs and complexities of other organizations in Canada and elsewhere. The work programs are also not only responsive to the need for standardization. Much of what occurs within the Canadian standards organizations cannot be understood without background knowledge about developments within the IT&T sector (world-wide, as well as in Canada) and within the companies and government departments that contribute participants.

In other words, a Canadian standards strategy cannot be developed solely from an examination of the designated Canadian standards organizations, their mandates and work programs.

(b) the coming crisis for the Canadian standards organizations:

Yet essential to any Canadian standards strategy are healthy participating organizations with active work programs. Unfortunately even the current work programs of the Canadian standards organizations cannot be sustained unless new members are forthcoming In light of the increasing new demands for participation being made upon the Canadian standards organizations and their members, this situation constitutes a serious crisis.

In the past, similar crises were resolved by the natural ebb and flow of membership in particular orgaanization and the emergence, when necessary, of ad hoc groups to supplement their work. Today, this response will not suffice.

The increasing demands being placed upon the Canadian standards community, the shrinking pool of resources for standardization and the need for a Canadian standards strategy in the face of globalization (not only of IT, and telecommunications but also all industries dependent upon IT&T standards) all combine to create different kind of pressure. They will require a new approach.

(c) overlaps, convergence and gaps:

It is in light of the impending shortage of human resources that the overlaps and convergence among the work programs of the Canadian standards organizations must be understood.

There is considerable overlap in the membership of the various groups, and some indication that similar issues are considered -- and occasionally even technical work done -- in more than one organization.

Yet, notwithstanding the increasing requirements for strategic co-ordination and management of the standards process (and increasing co-ordination among the organizations), the Canadian standards organizations are likely to remain "bottom up organizations. They are likely to continue to operate in a highly decentralized manner.

In this context, TSACC has a particularly important role to play if there is potential for a Canadian standards strategy.

(d) changes are needed; some are already in progress or well within the range of possibility:

Ironically, while other countries investigate whether to emulate the Canadian approach -- in particular the Standards Council of Canada and the Canadian Standards Association -- the current situation in Canada is not well attuned to the specific needs of the telecommunications and information technology sectors.

It is essential that discussions begin about how to adjust CSA/SCC procedures and decision rules to support the work programs of the voluntary standards committees in the IT&T sector.

There is willingness on the part of SCC and CSA to recognize problems in the current situation. As SCIT's experience with CSA demonstrates, there is also a willingness to discuss new methods appropriate to the sectors involved. Furthermore, models exist in other jurisdictions about how work programs might be better supported, processed and integrated.

Similarly, resolving the crisis in people and resources depends upon the re-assessment of the government role in standardization, good relationships between government and industry and a commitment to continuing rationalization of the "standards portfolios" within government. These too are part of developing a Canadian standards strategy.

(e) communication gaps:

Any successful Canadian standards strategy is first and foremost a product of communication among those active in the standards environment.

At first glance, the Canadian standards environment does not lack information. Individuals and companies are members of more than one group and, assuming they actually participate actively in each group, can provide information links between organizations. The volume of paper, reports from meetings etc. is positively staggering.

Moreover, no one questions the need for a clearing house -- a database to supplement and speed up the current paper flow (being undertaken by several co-operating organizations including TSACC, SPO and the Standards Council).

On close examination, however, the system is beset with problems of information flow: The very size and scope of the paper flow, the fact that much of its information remains "undigested" and thus inaccessible to those not already aware of it. (Note:

Formal standards are currently abstracted and key word indexes are available through the SCC, but similarly accessible information does not exist for draft standards or, more importantly, for the activities and changes in standards organizations of interest to Canadian industry)

The existence of a many different groups means that, in fact, very few people can expect to have command of the information. Interestingly, participants in the Canadian standards organizations would be among the first beneficiaries of a more accessible information flow.

(f) standards and the new economy:

It is widely recognized that telecommunications and information technologies are at the centre of the new economy and the resulting globalization of all industries. Industry needs are being more sharply delineated; virutally everyone agrees that standardization must become more "market-responsive".

But it is less clear how this situation will be reflected domestically among the Canadian IT&T standards organizations.

The new economy and globalization make "strategic planning" within the Canadian IT&T standards environment especially important. No less than the crisis of resources, the pressures for globalization will force change in the Canadian IT&T standards environment.

(g) "upstream" work is increasingly demanded:

In the new economy, the "upstream" component of the work programs of Canadian IT&T standards organizations assumes even greater importance.

In today's environment, there are many "upstream" organizations to which attention should be paid. Most fall outside the current work programs or mandates of the CNO's. Some are regional, but others are more functionally oriented or connected to user interests.

How Canadian industry is, can (given existing resources) and should be linked to these other "upstream" efforts are all critical questions which have not yet been adequately addressed. Informal and ad hoc groups can be used; TSACC has already played an important role. But the questions remain about which group(s) should be involved, and how decisions about Canadian contributions should be made.

(h) international versus regional orientations:

The Canadian standards environment has long acknowledged the importance of international standardization, and few would underestimate the contribution that Canada has made.

Although no one proposes a change in priorities, several contrary pressures exist within the Canadian standards environment. Regional or American standards organizations have been sometimes more important to Canadian companies than international ones.

With NAFTA increasingly requiring a regional orientation, regional strategies are essential, especially if they can be made truly regional in their orientation.

(i) assessing the "downstream" need:

In spite of the continuing importance of "downstream" activities within the work programs of the Canadian standards organizations and the need to make standards available quickly for Canadian companies, it is this aspect of the work programs of Canadian standards organizations causing serious questions to be raised.

Few would suggest that the current work programs of the Canadian standards organizations (i.e. their "downstream" activities) are yet fully rationalized, efficient, productive and well co-ordinated.

Yet it is worth emphasizing that many of the problems do not lie simply with the organizations themselves nor can they be addressed by any simple program of rationalization.

(j) other downstream roles:

"Downstream" has traditionally been associated with the publication or distribution of standards in Canada, and with "made in Canada" standardization.

In fact, unfortunately many other kinds of "downstream" efforts -- dissemination and promotion -- fall outside the current mandates or feasible work programs of existing Canadian standards organizations. These involve (1) consultation with the currently non-participating Canadian industries,(2) educational efforts about the importance of standardization, (3) further integration of user groups and, (4) most importantly, the investigation of feasible means to link the needs and resources of Canadian industries to the standardization process.

Attention needs to be paid by current standards participants to developing new mechanisms for involving those less directly affected by standardization in supporting standards work.The SPO is an important tool in this regard, but alone it cannot accomplish the task.

Although resources are constrained, adding this new task to the work programs of the designated Canadian standards organizations may have considerable pay-off for the standards community and Canadian industry. It is an essential part of any Canadian standards strategy.

(k) reassessing the needs for standardization:

"Downstream" activities sometimes include "made in Canada" standards.

It seems likely that both competition-related and performance "made in Canada" standards will continue to be necessary in the immediately foreseeable future, but a reassessment should take place once "the rules of the game" have been established for competition-related standards.

Similarly, there is need for a "costs and benefits" assessment of performance standards and of standards designed for uniquely Canadian needs. It is reasonable to ask (without prejudging the answer) whether the same resources could be used more effectively in the future in light of the new challenges of standardization?

(l) using standards for industrial policy:

Standards can be used as integral components of industrial policy but only in particular circumstances, and in such cases, research consortia and partnerships are likely to be more useful for producing the standards than the existing Canadian standards organizations.

This is not a criticism of the Canadian standards organizations; simply none of them was envisioned or is currently mandated and designed to operated with the needs of industrial policy in mind.

Recommendations:

In several instances throughout the report it is suggested that new proposals need to be undertaken to support a Canadian standards strategy and the work programs of the Canadian standards organizations, specifically in relation to their efficient co-ordination in a period of increasing human and financial constraints.

It would be tempting to recommend leaving these tasks to government, which has (at least in theory) the resources to support ithem or to consultants who might prepare reports for consideration. Both approaches would be wrong because success in any of these initiatives depends directly upon the willingness of those involved to implement changes.

It would be much more appropriate for TSACC members themselves to undertake the necessary work program related to recommendations in this report (and the two complementary reports) they find acceptable, using ad hoc working groups. To facilitate the operation of these ad hoc working groups, a small supplementary staff working through the TSACC secretariat might be usefully deployed if resources could be found to support it .

The ad hoc working groups might undertake (assuming TSACC members agree on any one of them) the following tasks:

- Develop a strategy for condensing and packaging information, in order to reduce the paper flow and render information useful to those who do not already have it. This should be done in conjunction with the new database.[3].

- Initiate and oversee discussions with SCC and CSA to see how procedures, decision rules, publication and the financing of standards work could be better matched to the specific needs and character of the telecommunications and information technology sectors and the resources available.

- Identify the many potential "upstream" organizations, and discuss how to develop appropriate relationships -- if required -- with them (assuming a commitment to international standardization and ctaking account of the diminishing resources in the standards community).

- Identify broad principles to determine *when* "made in Canada" standards are required, and make recommendations for their speedy and timely development, some of which may not include the Canadian standards organizations.

- Continue explorations about how the Canadian standards organizations might co-ordinate or even eventually merge their work programs in an era of increasingly constrained resources.

Undertaking these tasks would give meaning to the word "advisory" (Telecommunications Standards *Advisory*...) in relation to TSACC. It would draw upon the unique resource created by bringing together all of the major participants in the Canadian standards environment. It would ensure that TSACC, among other groups, represented a clearly defined "value-added" for its individual members and that TSACC becomes an important contributor to a Canadian standards strategy.

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Chapter One
Introduction

In mid year 1992, a study was undertaken to examine the work programs of seven Canadian standards organizations. The study was commissioned by the Department of Communications, working in close co-ordination with the Telecommunications Standards Advisory Council of Canada (TSACC), a non-government body with membership from the standards organizations and their primary industry and government participants.

The purpose of the study is as follows:

To analyze the mandate and work programs of seven designated Canadian standards organizations to determine the suitability of those programs in contributing to the development of appropriate Canadian telecommunications standards strategies.

To examine how those programs interrelate and identify all other relevant issues such as possible overlaps, gaps or inconsistencies, and propose options or recommendations.

To identity the barriers and opportunities that might exist related to the development of appropriate telecommunications strategies.

Although the contracting authority is the Government of Canada, the audience for the report is TSACC, or more particularly the membership of TSACC.

The study joins two other reports, one prepared for TSACC ("Program Activities of the Canadian Standards Committees") and theother for the Standards Program Office in the Department of Communications (called the "Hall Report"). The Hall Report summarizes discussions from the national and regional seminars (sponsored by the SPO) on IT&T standardization, and it contains recommendations. Like the TSACC study, however, this report deals more directly with the Canadian standards organizations. But like the Hall Report, it contains an assessment and recommendations. Although based on a large number of consultations, the views expressed in this study are solely those of its author. Different in their mandates and focus, the three reports are complementary in many respects, including their desire to strengthen IT&T standardization in Canada.

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The research for this report involved a review of written documents, and interviews with the TSACC members and observers. Thirty-five interviews were done, and all have been transcribed. The interviews were conducted on a not-for-attribution basis. Once the interviews were completed, a preliminary report was circulated, and TSACC members were given an opportunity to submit comments. Their comments have been incorporated in the revisions to the report.

The standards organizations of particular interest are SCIT (a CSA committee on inforation technology standards); SCOT (a CSA committee on telecommunications standards); CNO/CCITT (a committee preparing Canadian submissions to the international telecommunications standards organization CCITT), CNO/CCIR (a committee preparing Canadian submissions on both standards and radio frequency allocation for CCIR), TAPAC (a Canadian standards body operating under the auspices of the Department of Communications), The Radio Advisory Board of Canada (an advisory committee to the Department of Communications on radio communications matters including but not exclusively about standards) and CIGOS (a Canadian organization dedicated to the promotion of open system standards) .

This list of standards organizations does not include several other standards development and standards related organizations in Canada. Of special importance is TSACC itself (a council established to facilitate co-ordination and strategic management of standards issues), The Canadian Standards Organization (parent organization to both SCIT and SCOT), The Standards Council of Canada (the parent organization of CSA), the Department of Communications (the parent organization of TAPAC and the CNO/CCITT and CCIR) the new standards committee established under a mandate from the CRTC to oversee interconnection standards in light of the CRTC competition decision, and numerous other groups which set standards, develop profiles, prepare contributions, co-ordinate government initiatives, disseminate information or represent the interests of specific groups. The work of these organizations will be touched upon in this report inasmuch as it relates directly to the seven standards organizations of central concern.

Chapter Two
Overview of the Standards Environment

It is helpful to have an understanding of the national, regional and international environment within which the seven standards organizations of particular interest function. This is true because the mandate and work program of each is related or directly contributes to that other groups. It is difficult to garner such an understanding, however. The standards environment is highly complex, with a multitude of groups operating in somewhat different jurisdictions, and with different mandates and responsibilities. The picture is also complicated by the existence of many ad hoc groups, whose work -- for reasons discussed below -- is sometimes more important than their official or long-standing counterparts.

The following overview is provided, then, simply as a guide to the many relationships implicated in the mandates and work programs the seven standards organizations of interest. As is common in dealing with standards, it is helpful to think of the standards environment in terms of "layers", with the international standards organizations forming the top six "layers" and the domestic groups, the bottom five "layers".

(a) The International Organizations: ISO, IEC and ITU in particular. See also GATT.

The international organizations play their most important role at the "political level". It is through them that decisions are made about the structure and relationships of the various operational groups involved in developing standards. They are also the forum for the discussion of such issues as the participation of developing countries in standardization and for the final approval of international standards and recommendations. ISO and IEC are private sector organizations; ISO draws membership from the national private-sector standards organizations in each country; ITU is a treaty organization; national delegations (from government state departments or departments of external affairs) make up its membership. GATT (also a treaty

organizations) deals with standards but only as a trade policy issue. It does not develop or approve standards.

I(b) nternational Standards Committees: JTC 1; CCITT; CCIR

JTC 1 was created relatively recently (1987) and it is a joint committee of ISO and IEC. CCITT and CCIR are long-standing committees of the ITU, the former dealing with telecommunications and the latter with radiocommunication. These three committees serve as the focal points for standards development, although they are relatively small, and especially in the case of the CCIs, inadequately resourced. Their primary functions are to establish procedures for international standards development and to give final approval to standards and recommendations (for the purposes of simplicity in this report, CCIR and CCITT recommendations will be called standards) emerging from their sub-committees (study groups etc.).

The actual work of standards development occurs in the technical sub-committees ("study groups") and working groups operating under JTC 1, CCITT and CCIR. There are many such committees. But even this is somewhat misleading. In order to achieve consensus on standards, it is often true that a number of options must be included in the technical standards. The "standard" in this case serves as a framework for the technology or system involved, but further specification is required if it is to be applied by industry. This further work is called "profiles", and it is done by yet other organizations (see below).

All the international organizations, but particularly CCITT, are undergoing very significant changes at this time. Some changes are designed simply to speed up the standards process. Provisions for "fast tracking", for strategic management and for approving draft or interim standards have been put into place. But a more fundamental reorganization is also taking place. Informally, it takes the form of greater co-operation between JTC 1 and CCITT. Formally, it involves a reorganization of the work programs of both CCITT and CCIR so that all standardization activities fall under the auspices of CCITT. CCIR will retain jurisdiction over spectrum allocation and radio communication issues (see further discussion, below).

Four other factors are important as catalysts for change. First is the long-discussed but now operational convergence between wired and wireless (tele)communications on one hand, and between information technologies and telecommunications on the other. Second is the increasing demand for standards to be developed well in advance (at least five years) of product and systems. Third, the resources available for standards development are diminishing, even while the demands for new standards activities has increased considerably. Finally, these organizations -- like all standards groups -- are paper-bound and paper-dependent, precisely when data communications is increasingly on line. The effect of these pressures changes is not yet apparent, and CCITT, CCIR and JTC 1 continue to function more or less as usual. Nonetheless, it is understood that a further restructuring will be required.

(c) The Inter-regional Organization:e.g. ITSC, GSC Group etc.

Everyone agrees that there are too many standards organizations, with too little co-ordination between them, and too many "layers" in the standards approvals process internationally. Ironically, it is this very perception which led to the creation of several new "international" standards organizations in the last few years. The reason for adding yet another potential "layer" to the standards process is to promote co-ordination among standards organizations and speedier development of standards especially in "high interest areas". But a further reason lies behind the new organizations. In high interest areas, information flow between participating standards organizations is mandated.

The new standards organizations exist in a somewhat uneasy relationship to CCITT. All their participants stress the close working relationship between their work programs and the CCITT, yet differences of opinion exist among their members about the long-term necessity for and viability of any inter-regional or new international group. Recently a decision was made to continue inter-regional co-ordination under the auspices of a new committee (GSC replaces the former GSMM) and to adopt a "wait and see" attitude towards a further meeting of the umbrella inter-regional group, ITSC.

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(d) Regional and national organizations functioning internationally: (for example: ETSI, T1, IEEE, ATSS, CITEL)

There are a number of standards organizations functioning as regional or para-international bodies. ETSI is the most well-established (although it is less than five years old). It is clearly regional in its mandate. (It worth noting that ETSI is not the only pan-European standards body developing IT&T standards.) There is widespread concern (justified or not) that by acting as a feeder organization and being represented in CCITT by its twelve member countries, ETSI functions as more like an international than a regional organization. ATSS is a regional organization (intended as an umbrella group to co-ordinate standards activities rather than as a new standards development group) for the Americas in the process of being established, partly in response to ETSI. CITEL is the long-standing organization associated with the OAS with a new interest in standards.

The regional organizations are not the only ones involved at an international level. Some national organizations function for all intents and purposes as if they were both regional and international standards organizations. For example, T 1 is an American organization formed in 1983 after the AT&T divestiture decision. A small portion of T 1's membership is drawn from other countries, but T 1's standards development activities are important outside the United States. For example, TTC (Japan) looks to T 1 for standards. Today T 1 is treated as a regional organizations in some contexts; and as if it was an international one in others. T 1 attempts to co-ordinate its work with CCITT, but T 1 standards are not always identical to CCITT standards and in some instances T 1 standards precede CCITT ones. T 1 is only the most well known of several such organizations.

In other cases, yet other new "international organizations" are created when new subjects -- broadband ISDN, multimedia -- attract attention. These organizations seldom have full international representation. They function primarily within a single jurisdiction, drawing a few members from other countries, and play a role in standards development comparable to national bodies in spite of their seemingly international mandate.

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(e) "Participating Standards Organizations": (TTC, TSACC, T 1, ETSI,TTA,ACC)

This is a new designation indicating the organizations active at the inter-regional level. The group is comprised of several quite different organizations. ETSI, as indicated above, is a regional group with strong links to both public and private sectors. As also noted, T 1 is a private sector national group whose work has international implications; TTC (Japan), TTA (Korea), and ACC (Australia) are national private sector organizations (governments may also be involved) engaged in standards development work in their own countries (actually, among these groups, only TTC does extensive standards development), while TSACC is different yet again. "Participating Standards Organizations" have official status as a group only in relation to the new inter-regional standards co-ordinating bodies (GSC/ITSC) noted above, but they may undertake work programs together (for example on EDH) and meet regularly.

(f) Industry Forums, Professional and User Groups with a regional or international orientation: e.g. ECMA, IEEE, INTUG, COS, and ad hoc groups etc.

As might be expected in a highly dynamic sector, many industry and professional groups are now engaged in standards development or standards related activities themselves. Some are long-standing; others operate on an ad hoc basis. At best, these organizations operate as "feeder groups", providing technical assistance, documentation and draft standards to facilitate the subcommittee activities of the international organizations (e.g. CCITT). At best, they also encourage both the promotion and the development of adequate profiles based on international standards and/or standards directly responsive to the specific needs of major users.

There is always the possibility that some of these groups will form around proprietary standards, and in such case hinder the adoption of open systems and international standards. Or such groups may be driven by an appreciation of the technical problems of standardization without adequate concern for the usefulness of the eventual standards. In all, their existence serves as a reminder that the formal or official standards process is often far too slow, cumbersome and

unresponsive to market needs and conditions to be very useful to industry.

(g) Canadian "Parent" Organizations: CSA, SCC and the Department of Communications

Both SCIT and SCOT are committees of the Canadian Standards Association, and consequently operate within its mandate and according to its membership rules and procedures. In turn CSA, a non-profit organization covering many areas of standardization, is accredited by the Standards Council of Canada, and consequently operates within its rules and procedures. It is CSA and SCC, not SCOT and SCIT, that officially designate and/or sell standards, which may have been developed, adapted or simply adopted by SCIT or SCOT (in the case of CSA) or produced by the international standards organization, ISO (in the case of SCC).

The "parent" organization of TAPAC, of the new committee on interconnection standards, and of CNO/CCITT and CNO/CCIR is the Department of Communications within the federal government. In the case of TAPAC and the new "interconnect" committee, departmental participation is mandated by the CRTC, but TAPAC deals with standards mandated under the other legislation or through the Department of Communications. In the case of CNO/CCITT and CNO/CCIR, government involvement is mandated because the ITU (parent to CCITT and CCIR) is a treaty organization. Each of these committees operates under a different division or branch of the Department of Communications. Significant efforts are now being made to co-ordinate departmental involvement in all aspects of IT&T standardization. In this connection, the Standards Program Office (SPO) within the Department of Communications, the focus groups on specific issues it sponsors, and a newly established assistant deputy ministers committee within the Department of Communications on standardization are significant.

(h) Support groups for standardization in Canada: e.g. CBTA, TSACC:

User groups are less active in Canada than in the United States, where they sometimes function themselves as standards development organizations. Nonetheless, CBTA (the Canadian Business Telecommunications Association), a few companies, some government departments (most notably Treasury Board but also many others) and crown corporations, and on occasion the

CBA (banking) play an active role as user groups in standardization. Note that the Treasury Board itself also operates a program to adopt voluntary standards, in the manner of a standards organization, in this case for use within the federal government.

TSACC was established to introduce the capacity for strategic planning in the standards environment in Canada. Operating as a co-ordinating council under the "parents" of both the federal Department of Communications and the Standards Council of Canada, its authority is derived from the impetus for change it provides to its members. There is no equivalent to TSACC in other countries, but a similar function is currently being introduced at a management level within most of the standards organizations just described.

(i) "Upstream" organizations:

Almost all of the organizations described thus far are "upstream" organizations in the sense of operating regionally or internationally. Some, but certainly not all of the these organizations have domestic counterparts whose task it is to develop contributions. Where no domestic counterpart exists, the onus for international or regional representation falls upon individual companies, on government officials or on TSACC. For example, several Canadian companies are active members in T 1, and others in TIA (U.S.); some individuals are members of IEEE committees. But there is no "upstream" organization to co-ordinate their participation or contributions officially. There is no official or *Canadian* representation in many of the "feeder groups" or user and standards related organizations (one person consulted listed six organizations where Canadian representation is essential but lacking; another listed three) even if it is not unusual to find Canadian companies or individuals actively involved on their technical committees or Canadian government officials playing key roles. TSACC functions with an informal mandate to represent Canada "upstream" to some bodies such as CITEL, ATSS, and GSC. The recognized "upstream" organizations in Canada are JTC 1/SCIT, CNO/CCITT and CNO/CCIR.

(j) The Canadian Standards Organizations:

Seven Canadian standards organizations have been designated for special interest in this

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report, but only SCIT, SCOT and TAPAC among them fall within the category of organizations developing (adapting or adopting) standards in and for Canada. As will be indicated below, the standards development activities of these organizations constitute only a portion of their work programs, and indeed, this aspect of their work is sometimes controversial.

These three organizations are not the only ones functioning in the IT&T community with respect to standards. As noted, the Treasury Board is active in this regard working with officials from several government departments. As well, a new committee under the auspices of the Department of Communications is examining interconnection standards in response to a CRTC mandate; several other groups, both long-standing and ad hoc, develop profiles or constitute "feeder" organizations or function as standards advisory bodies (for example The Radio Advisory Board of Canada) in support of standardization. Interestingly TAPAC can also be regarded as a standards advisory body, in this case to the Department of Communications.

(k) National groups engaged in standards support activities:

A number of other organizations are involved in activities related to standards. As noted, both TAPAC and RABC advises the Department of Communications, acting as a "feeder " for some aspects of standards work. An equivalent to COS exists in Canada, CIGOS, to promote open systems. ACT, ITAC, EEMAC, CBTA and Radiocom are industry trade groups with a significant interest in IT&T standards development and approval. Along with some of their individual members, they represent segments of the industry on a variety of standards bodies. As well, there are standards groups engaged in promotion, distribution and/or profile activity in conjunction with proprietary standards (e.g. UniForum) .

Chapter Three

The Mandates and Work Programs of the Seven Designated Standards Organizations

There are a number of standards organizations in Canada, including some developing standards, some focused on applications, some on the promotion of particular standards and others incorporating an interest in standards in a broader work program. Seven of these groups have been designated for study, and in each case, the emphasis for this report is on their mandates and work programs. This chapter offers an overview of the seven organizations and an assessment of their work. Of particular interest is the possibility of overlap or convergence among these groups.

No assessment is without its bias, and this study was mandated to provide an evaluation. Although the following descriptions and discussions are based upon interviews with members of TSACC, it is stressed that the opinions expressed are solely the responsibility of the author of this report.

(a) Steering Committee on Information Technology:

SCIT is a committee of CSA, accredited by the Standards Council of Canada, to deal with information technology. It works as a harmonized committee, dealing with "upstream" contributions to JTC 1 as well as "downstream" activities through SCIT. As of the most recent membership list available (end of 1991), it had thirty-seven members and associate members.

SCIT, like other CSA committees, functions with a membership matrix. In SCIT, however, government officials are not represented as a separate category but only as users or general interest members. Membership is based on expertise and interests, and is by nomination. Technical subcommittees, on which non-members participate, also reflect the membership matrix.

The technical committees are fully responsible for the technical content of the standards,

which recently include as many as sixty standards yearly. The main committee meets every eight-ten months, and the executive six times annually. The executive is responsible for co-ordination and liaison, allocation of resources, liaison with regulatory authorities (if required) setting up new committees and promotion of IT standards. The standards are all voluntary standards.

Although SCIT is a harmonized committee, its primary work is "upstream". As one person indicated, "The reason people participate is that they want to be involved in the international development of standards." The technical committees prepare Canadian submissions for JTC 1, and only when a JTC 1 (ISO/IEC) decision has been made, does the "downstream" activity become important. SCIT recommends the JTC 1 standards, almost always without modification, as standards under the National Standards System of Canada, at which point they are available for sale by the CSA. Standards are published as Canadian standards "when there is a good chance that (SCIT) can break even economically" based on their sale. Prior to a recent reorganization, the cost of publishing a Canadian standard (approved by SCIT; published by CSA) was $3000. With the new arrangement in place with CSA, this cost has been reduced to approximately $500 per standard. Money from the sale of Canadian standards supports the national activities of SCIT.

This raises an interesting point. Because the standards are unchanged when they become Canadian standards, the same standards are available directly for sale through the ISO and to the participants in JTC 1 committees developing them. With the exception of SCIT members (and associates) there is only a small market for the sale of standards in Canada.

As well, although SCIT illustrates the benefits to be gained from harmonization, it is not easily emulated. In the case of SCIT, the same members in the same meetings function as SCIT or CAC/JTC 1 depending upon the item on the agenda. It would be inaccurate to portray the situation as co-ordination of two committees, because in effect, there is one committee with two separate functions operating with different Chairmen as each item on the agenda requires. For SCIT, there is also little question of which (or whose) standard to adopt or of whether significant modifications should be made in the Canadian case. As well, as one person indicated, "The players in SCIT are not at odds with each other". All of these factors making for ease of harmonization are related to the type of standard -- voluntary -- and the sector -- information technology -- the markets --

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international -- and the membership -- significant representation from multinational firms.

A closer look at membership is useful. The membership profile (the last data available from November 1991) is as follows:

Members:

IBM 1
Government (user interest) 4
Government (general interest) 1
Individuals and/or consultants 5
BNR 1
Teleglobe 1
Telecom Canada 1
Unitel 1
Other companies (producers interest) 4
User groups (banking, steel industries) 2

Associate members:

Bell 2
Government 3
Individuals and/or consultants 5
Standards Council 1
Industry Trade Associations 1
IBM 2
BNR 1

SCIT has attracted user interest representatives who are not themselves standards developers or producers. Individuals and consultants also make an important contribution. The proportion of government officials is higher than one might expect (although government is mainly represented in a user capacity, reflecting the important role governments play as users).

Most interesting, however, is the relatively large number of members or associate members from companies normally associated with telecommunications. To some extent, this is to be expected, as technologies are rapidly converging. But significant competition issues still exist between IT and telecom about how (and where) the "intelligence" will be structured into networks. And moreover, in spite of the overlap of companies which are members of both SCIT and SCOT

(and/or the CNO CCITT) and the designation of a liaison person between the two committees, they function quite independently of each other. Any proposal to merge SCIT and its telecommunications equivalent in Canada would not be feasible in the immediately foreseeable future, even though IT and TC function under the same umbrella in a few other jurisdictions. The industries, orientations, members, markets and even cultures currently are still too different.

The work program of SCIT is almost entirely determined by JTC 1, and its technical committee and working group agendas. Canada holds eleven out of sixty-eight of the JTC 1 working group or sub-committee secretariats. SCIT is active on twelve of JTC 1 technical sub-committees including one that involves a joint technical committee with the Canadian General Standards Board (a different accredited standards organization from CSA).

The SCIT steering committee determines when to create a technical sub-committee in Canada, but given the nature of SCIT/JTC 1 membership, member companies often also have the option of participating in JTC 1 committees through their representatives other jurisdictions. Their participation in the Canadian organization (in national standards development) is a matter of company policy. In SCIT/JTC 1 sub-committees, as in most standards committees, decisions are usually made on a "bottom up basis" and participants "vote with their feet."

As mentioned, SCIT has informal provisions for communication with other standards development committees and organizations (SCOT in particular). There is some overlap in membership with the CNO/CCITT although the work programs of the two groups are not parallel. That said, it appears that actual co-ordination between SCIT and the standards development groups dealing with "grey" or complementary issues (this would include SCOT, TAPAC and CNO/CCITT) is infrequent, even though there are increasingly close working relationships at the international level (ISO, IEC and ITU/CCITT). There is a strong connection between SCIT/JTC 1 and CIGOS,but again through the overlap in membership.

Everyone (among those surveyed) agrees that SCIT/JTC 1 is a well-run and functional committee. Unlike all of the other standards organizations designated for study, it attracts little or no criticism. In part, this is a tribute to its leadership. In part, its task as a harmonized standards

committee is considerably more straightforward than many others. But SCIT/JTC 1 considers itself to be in crisis. More than most groups, it recognizes an impending crisis for its work program, a crisis caused by diminishing human and other resources, the limited market for its standards (especially with two competing sources), the cutback in funds for travel related to international standards development (SCC) and the re-deployment of resources by several participating companies.

As noted, SCIT/JTC 1 has taken some steps to deal with the crisis in its work program, negotiating with CSA. Whether this will be sufficient is open to question, but SCIT/JTC 1's actions demonstrates the willingness of both CSA and SCC to recognize the problems and to alter long standing practices to accommodate the actual conditions in the sector.

(b) Steering Committee on Telecommunications:

SCOT is a committee of CSA accredited by the SCC to deal with telecommunications. It is not a harmonized committee, and it deals with "downstream" activities only. SCOT is a relative newcomer to the standards development environment, having been created on the recommendation of the Lapp Report about a decade ago. At one time in its short history, SCOT had a mandate to handle issues previously, and now again dealt with by TAPAC, but today SCOT exists alongside TAPAC and it deals with voluntary standards only.

SCOT's mandate focuses on "the definable functional and performance characteristics of terminal equipment attachments" (telephones and their more sophisticated business equivalents) to telecommunications networks, "network protection issues not dealt with by TAPAC", and the interfacing of networks. It does not deal with "the design and arrangement of networks or with issues of electrical safety", where other standards development groups are active.

SCOT, like all CSA committees, operates with a membership matrix designating the proportion of members by category. In the case of SCOT, there are four categories including government, producers, carriers and general interest. Note that government is included explicitly, and that users participate under the general interest category. There are approximately forty

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members of SCOT, three-quarters of whom require standards but do not themselves have expertise to participate in their detailed development. The steering committee decides when work on a given standard seems feasible and desirable, and assigns it to a technical committee. Membership on SCOT technical committees usually involves five to eight people, of whom about half attend each meeting. Membership on the technical sub-committees is intended to reflect the matrix.

In its work program, SCOT is currently active in processing standards, with fourteen standards recently being completed, six being considered for publication, 2 being prepared for publication and three being proposed (as of April 1992.) Yet SCOT has been often criticized for its lack of standards production, and some people interviewed feel that the output is still less than it should be.The small number of people involved in SCOT, and the current demands incurred by participation in a technical committee (often more than ten days a year) places a limit on the production of standards. A strategic planning exercise has been conducted by SCOT, but the report was not available.

Related to its work program, SCOT has also conducted an assessment of the costs of its standards development, indicating that the cost of developing a Canadian standard is more than ten times that of adapting a standard, and perhaps 20 times that of a Canadian made standard. SCOT has recently assessed the market for its standards, estimating that the potential for sales rarely exceeds 150. In other words, by simply adopting standards (as Canadian standards). SCOT might expect to "break even" if the resulting Canadian standards were purchased only from their Canadian source, but SCOT would have no possibility of covering the costs other standards development from their potential sale. This fact increases the significance of government support for SCOT and, ironically, also the pressure upon SCOT simply to adopt standards developed elsewhere as Canadian standards.

A strong argument can be made that it benefits Canadian industry to have SCOT simply adopt standards developed elsewhere as Canadian standards. By doing so, SCOT makes them readily accessible through the CSA catalogue. There appear to be some problems for Canadian industries in gaining access to T 1 standards except in this manner, because of difficulties in making suitable arrangements with ANSI, T 1's parent organization. And CSA, the parent

organization, does not have affiliate-style arrangements with some of the other American standards development organizations equally of interest to SCOT's members. In other words, even if SCOT did not adapt standards or develop unique standards, a case can be made that SCOT still has an important work program, a role to play as a "downstream" organization. In the case of telecommunications standards, however, there is also an argument to be made for a SCOT work program involving the adaption of standards developed elsewhere, because Canadian telecommunications equipment and networks are currently not always identical to their American or European counterparts.

But the adaption (and certainly the adoption) of standards developed elsewhere raises two questions. The first is simply whose standards should be adopted and/or adapted. Most SCOT members agree on the answer. Their primary markets are North American; adopting T 1 and TIA standards is the only reasonable course of action. (as one person noted, "SCOT is unashamedly oriented to T 1", or as someone else said, "If I had to make a decision between North America and CCITT, I'm going to go North America.") It is worth noting that T 1 and TIA are not the only North American or American organizations developing the standards of interest.

The second question is about the relationship between SCOT and "upstream" activities. Obviously "upstream" can refer to T 1 and TIA, and indeed SCOT member companies are active in T 1 (and/or TIA and other North American and American standards development organizations). Co-ordination of a "Canadian" position is informal, because, for example, neither T 1 nor TIA accepts official delegations (especially headed, if even nominally, by government) and because both are organizations of member companies, not member organizations.

But "upstream" more normally refers to the international organizations, and in the case of SCOT, to CCITT in particular. It is here that serious issues arise. If CCITT standards were always developed in advance of T 1 standards (as noted, "T 1 tends to be earlier than CCITT"), or were directly usable by Canadian industry (instead of containing many options), a case could be made for viewing "upstream" activities simply in terms of CCITT. If adequate profiles existed for the CCITT standards, and/or the standards profile development organizations were themselves fully harmonized with CCITT, an "upstream" relationship with CCITT might be more feasible.

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Finally if T 1 standards were always compatible with CCITT standards (as is increasingly becoming the case, fortunately), then an informal two-stage process (an informal process, to be sure, because T 1, a private sector organization, cannot be harmonized with CCITT, a treaty organization), the problems of harmonization could be eased. But as yet, none of these conditions fully prevail, and SCOT, the "downstream" organization is not readily harmonized with CNO/CCITT.

For some members of SCOT, the "upstream-downstream" issue is resolved nonetheless. The same people, or rather representatives from the same companies, can be involved in both SCOT and CNO/CCITT. As one person noted, "The same people can walk across the street." Recall that in both groups, members "vote with their feet", choosing the venues most congenial to their interests and influence. For other members of SCOT, the issue is one of resources and mandate. They contend that SCOT's current mandate and access to resources precludes involvement in the large number of CCITT committee activities.But for some SCOT members (and the companies they represent), the issue of "harmonization" between SCOT and its "upstream" international counterpart remains very much on the table in any discussion of SCOT's mandate and work program. This last view is undermined by a practical reality which sees standards adopted internationally but not always applied in Canada, on one hand. On the other hand, it is supported by the commitment to international standardization existing among virtually everyone involved in standards development in Canada.

It is difficult to tell whether there are convergence or overlaps in the work programs of SCOT and TAPAC. In theory, TAPAC deals exclusively with mandated and regulatory standards, while SCOT deals exclusively with voluntary standards, but (as will become evident in the discussion of TAPAC) the distinctions are less easily maintained in practice because the both committees deal with aspects of terminal attachments and networks. There is appears to be no formal co-ordination between SCOT and CNO/CCITT (notwithstanding any common membership), indeed (as seen from an outsider's perspective) almost no communication or shared knowledge between the two groups. As noted above, co-ordination with SCIT is also lacking except inasmuch as there is overlapping membership.The resources of SCOT appear to be fully taken up with the voluntary standards SCOT is mandated to deal with (indeed, many would argue

there is a serious shortage of resources for this purpose) and with organizational matters.

In the interviews conducted for this report, some people suggested that SCOT functions very well, performing an essential function in the Canadian standards environment . Most others (note: only TSACC, and not SCOT members were surveyed) did not agree. Some agreed that SCOT's functions were essential, but felt that the committee itself was "politicized" and thus less productive than it should be. Others yet had doubts about the need for SCOT, although everyone agreed that access to North American voluntary telecommunications standards was important. Reasons given for SCOT's problems included the following: membership and voting procedures especially for executive positions, the relationship with CSA and its attendant costs and bureaucracy, leadership issues, lack of a focused mandate especially in relation to its sister standards organizations, lack of harmonization and individual problems.

It is the assessment of this report that difficulties do exist with SCOT. Yet if SCOT did not exist, someone would probably create a comparable group. SCOT's mandate and work program are important. More important, however, it is the assessment of this report that SCOT's difficulties stem from factors other than those listed above. The problems faced by SCOT are structural -- related directly to its mandate and work program -- not "political", procedural or personal, even if they are often played out in procedural terms.

These problems are as follows:

(1) SCOT is dealing with an industry currently in flux, where issues of competition have not been resolved or even accommodated yet. SCOT is not the appropriate committee for resolving competition issues, but it has served as the location for the debate, effectively undermining its work program.

(2) SCOT's work program (along with TAPAC) is premised on a clear demarcation between voluntary and mandatory standards, but when the same networks and products are involved, the lines are blurred.

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(3) Close examination of the formal mandate of SCOT reveals more about what SCOT is not intended to do than about its proposed functions. This suggests a problem in the formal mandate of SCOT, and indicates a need for co-ordination of the work programs of all the various standards organizations working in roughly the same area.

(4) As discussed above, SCOT members have, and will continue to have, divided loyalties with regard to their "upstream" activities. Committed to international standardization, most members nonetheless deal with market realities which dictate a North American or American strategy. This makes harmonization SCOT and CNO/CCITT a better idea than a practical reality.

(5) SCOT, more than any other group, faces the issue of how extensively any standards development body in Canada should be engaged in adapting (as opposed to simply adopting) standards developed elsewhere or in creating standards for uniquely Canadian needs.

A parallel between SCIT/JTC 1 and SCOT is often drawn, and indeed both are comparable committees within the CSA/SCC framework. All of the problems just described make SCOT very different from SCIT, and foreclose some options for SCOT that SCIT has available. That said, SCOT and the Canadian standards community would benefit from much more co-ordination than apparently now exists.

(c) The Terminal Attachment Program Advisory Committee:

TAPAC is a committee established under the auspices of the Department of Communication, but its primary authority is derived from the CRTC regulations and decisions. However, TAPAC's the mandate can originate from several other sources including legislation, certification requirements or, under the new Telecommunications Act (if passed), perhaps from the Minister (department) itself.

In some senses, TAPAC is not a standards development committee because it only makes recommendations to the Department of Communications for mandatory standards. At the same time, TAPAC is less like an advisory body than, for example, the Radio Advisory Board of

Canada, having less of an independent existence from the Department and being more directly engaged in standards development.

Interestingly, TAPAC's membership structure parallels committees operating under the CSA structure. That is, although TAPAC makes recommendations to the Department of Communications, its "membership matrix" includes the federal government. Provincial governments also are represented in the matrix, but it appears that provincial governments now play a minimal role. Other categories of membership include the telecommunications carriers, manufacturers and, finally, users and other interest groups. These categories are a matter of convention, not rules as is the case with CSA/SCC committees, with the result that TAPAC is not widely viewed to be as open as its sister CSA steering committees. Meetings of TAPAC are open, however, and membership on task forces and working parties is accessible to non-members with the appropriate expertise.

As noted, TAPAC came into existence, and its primary mandate, is associated with the CRTC and the mandatory standards pursuant to CRTC decisions. This includes the attachment of equipment to the networks and facilities of the telecommunications carriers (the protection of the network and its viability). As such, in effect TAPAC was the product of the CRTC decision to permit competition in terminal attachments and of the CRTC's (among others) concern that standards, or their absence, not be used to undermine regulatory decisions. In broader terms, this type of standards activity could be termed competition-related. It is worth noting that the CRTC is assessing its regulations to see whether they are required. In the absence of mandatory standards based on CRTC decisions, it is likely that TAPAC would continue to act, viewing the CRTC's initiatives as "percatrory" (expressing a strong will that something be done, without mandating it; the term "percatrory" is taken from an interview)

But TAPAC has undertaken other standards activities, which although also involving mandatory standards, are best understood as performance standards in association with certification. It is with respect to this second role that issues arise, particularly about the degree to which such standards are needed (to what degree is network viability and integrity currently at risk from terminal attachments), whether such standards should be mandatory (in some other

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jurisdictions, mandatory standards for terminal attachments are more limited) and the demarcation between mandatory and voluntary aspects of the same equipment. A few people interviewed went so far as to suggest, " In the long term, in a digital world, there's probably no need for TAPAC" or that "TAPAC has outlived its usefulness."

Given their formal mandates, it would not be surprising if TAPAC and SCOT dealt with the same subjects. TAPAC's interest is narrower, however; as noted, TAPAC deals with only those aspects of CSA standards that are to be made mandatory. In other words, a CSA standard on the same subject might well contain more items, some of which remain voluntary. It is also worth noting that in general (i.e. in other sectors) the relationship between mandatory and voluntary standards is often complicated, especially when governments quite often adopt and/or reference standards developed by non-governmental bodies.

The two groups, TAPAC and SCOT, do not "sit down together" or formally co-ordinate their interests. Rather, co-ordination is achieved through the considerable overlap in the membership of the two groups. Individual members are in a position to know how to avoid duplication of work. The question of whether SCOT and TAPAC should be merged (under the CSA structure) has been important in the past and remains so with a few individuals; but this issue is now resolved (one presumes permanently) in favour of having two groups.

There are some instances, of course, where CSA(SCOT) standards do not exist and nonetheless it has been determined that TAPAC will act. TAPAC is free to draw upon the experience of standards development organizations both in the United States and internationally as well as that of SCOT. Co-ordination with U.S. and international groups is through the individuals (companies) who are members of TAPAC and also involved in standards development elsewhere. TAPAC has no "upstream" role, nor does it closely co-ordinate its activities with the CNO/CCITT.

Given the pre-eminent importance of North American markets for many of its members, and the increasing need for harmonization with the United States, TAPAC pays close attention to the FCC, the US federal regulator which (unlike the CRTC) mandates standards. Joint work programs are likely to be undertaken with TIA, a private sector organization, however, and only

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subsequently submitted as contributions to the FCC.With NAFTA,TAPAC may become more involved in regional discussions with its American and Mexican counterparts.

The CRTC has recently made a further competition-related decision involving standards issues, in this case concerning network interconnection. The CRTC has suggested a separate standards committee be formed, one modelled on the TAPAC experience. There has been some discussion of whether TAPAC's mandate and work program could be revised (along with its name) to include network interconnection as an extension of its competition-related standards activities, especially because the requirement for terminal attachment standards has now mainly been met. But the argument has been advanced that different expertise and participants are involved. In any case, a decision has been made to establish a new standards committee, roughly parallel to TAPAC, rather than to expand or alter TAPAC's mandate and work program.

TAPAC has recently commissioned a consultants report to assess its current strategic and management issues. The report was not available. On the basis of the consultations done for this report, TAPAC is considered to be a reasonably smoothly functioning committee. For most people, the Department's role in TAPAC is widely seen to be useful, especially where competition-related issues are involved.Where questions about TAPAC exist, they concern the scope of the mandate and work program of TAPAC and usually not its operation.

(d) The Radio Advisory Board of Canada:

The Radio Advisory Board of Canada is one of the oldest standards related groups in Canada. It currently serves as an advisory and consultative body for the Department of Communications in the field of radio communications, primarily dealing with matters concerning the radio spectrum, its management and allocation. RABC attempted to become certified under the SCC as a standards writing organization, but was not approved because the RABC did not meet the SCC criteria. RABC has twenty-nine members who support the organization by their fees.

RABC is intended to be an organization of non-profit Canadian organizations, but recently it has permitted individual members (who themselves may also be represented in one or more of

the industry trade organizations) Currently, eight members are industry trade associations, and three are individual companies. Government bodies (including crown corporations) account for fifteen memberships.

The focus of RABC's work program is on radio-communications as it affects both broadcasting and telecommunications. Eight of the members come from broadcasting; eight from telecommunications. (Others reflect both or neither sector specifically) RABC is involved in an advisory capacity in standards development mainly reflecting the interests of users. But although eighteen members are reflect a user interest (counting both carriers and many government participants as users, in this instance), some producers groups are also represented.

This membership profile is quite consistent with the mandate of RABC, which stresses that the organization exists to promote the interests of radio spectrum users, including those from the telecommunications sector. Although traditionally focused on issues related to the radio spectrum, RABC currently also deals with equipment and system matters related to digital radio transmission equipment, as well as with regulatory and policy matters independent of standards.

Like other standards organizations, the work program of RABC is carried out through its technical committees. The five committees meet once or twice a year and prepare comments which are forwarded to the RABC Chairman before being submitted to the Department of Communications. Concerns include the technical and regulatory protection accorded to users, protection from interference etc. Digital cordless telephones and performance standards are also dealt with, but a large portion of RABC activity is focused on potential problems of interference among spectrum users.

As noted previously, RABC's status is clearly advisory, and there is little question about the Department of Communications' role in relation to RABC (for example, the Department is not a member, but rather receives advice and contributions) This creates a reasonably smooth working relationship with the Department of Communications. For the most part, RABC should be considered something like a "downstream" group, although harmonization of Canadian standards and regulations with those of the FCC is also important to RABC members. There appears to be

almost no co-ordination between RABC and the other "downstream" standards groups designated for study in this report, including the other DoC advisory bodies, other than a small overlap in memberships. RABC has no specific "upstream" function; its members participate independently in the CNO/CCIR if they wish to make contributions to "upstream" issues. Many RABC members are not members of CNO/ CCIR and vice versa

(e) The Canadian National Organization for the CCITT Consultative Committee:

The CNO/CCITT is the "upstream" committee responsible for preparing contributions to CCITT and its many committees. As is required by the treaty provisions involved in ITU/CCITT, its contributions represent formal Canadian positions. Contributions can be authored by individual company members, but they must be accompanied by a letter from the Department of Communications before they will be accepted by the CCITT or its committees. The CNO/CCITT is chaired by an official of the Department of Communications, but its membership reflects a working amalgam of industry and government interests.

Of the two hundred and twenty-four study group members for whom information was readily available, government bodies and related organizations contributed 57 participants. Eighty-one of the others were from the various carriers; twenty-five participants were from companies (24 companies represented) other than BNR, Northern Telecom and MPR which together contributed fifty-seven participants to the study groups.

Many study group participants take part in one committee only, but seventy-two were involved in more than one group. Fifteen people were involved in four or more groups. Not surprisingly, those people active in more than one study group come from the government departments or companies which themselves also contribute many participants. Thus, if memberships in study groups had been counted in this rough survey, as opposed to individual people, it would appear that the study groups do not reflect very wide-spread participation from industry. Given the topics covered by the sub-committees, however, and the resources necessary to sustain active participation in study group activities, this situation is to be expected.

To be a representative to CCITT, it is necessary to be either from the federal government, or from an organization which is a member of CCITT. But other experts are invited to participate on sub-committees and in technical work, and thus the national study group participants are not necessarily from CCITT member organizations.

Like all standards development organizations, the primary technical work of the CCITT is done through its sub-committees (study groups etc.). There are also national study groups for many CCITT sub-committees. A steering committee (including three representatives of the carriers, two telecommunications manufacturers, one company from the radio-communications/telecommunications sector and others from the Department of Communications) approves Canadian contributions to CCITT, although the rules and guidelines for transmittal of contributions and the structure and composition of delegations to CCITT fall within the responsibilities of the Department of Communications. Fifteen national study groups are active enough to have chairman.

The work program of the CNO/CCITT is best understood as having two components. First, Canadians have taken considerable leadership in the operation (and current restructuring) of the CCITT and in promoting agreements among members about standards. Some of this work is done through sub-committees or special committees, but much is also done informally. Second, Canadians make many contributions to the various sub-committees on technical matters of interest to their members. In this second role, some have suggested that CNO/CCITT functions as a "flow through" organization (One person called the CNO/CCITT a "post office".) There are a few study groups, however, in which government people have specific interest and expertise. This is in contrast with the first role, where government officials (among others, to be sure) have been quite central to the CCITT work programs. The CNO/CCITT facilitates the contributions of its individual members to CCITT and/or agreements about the priority of specific industry contributions in those (few) instances where conflict among industry contributions exists.

The work programs of the national study groups are largely driven by the CCITT committee agendas, as might be expected in an "upstream" organization. Thus, to the degree there are overlaps and convergence either among CCITT groups or between CNO/CCITT study groups

and other non-CCITT-related technical committees, they are generated outside Canada. (As one person noted, "If it were set up from scratch again, many of the things that are in CCITT would probably be at ISO") This is not to say that convergence or overlaps are a major problem. Rather, as one person noted, "if you wanted to get down to the bits and bytes of committee structure, sure you could clean some stuff up. But that's not typically something driven out of Canada". Or as someone else noted, " "The overlap comes in the management of the process, very little in the output of the standards writing organizations. The community is too small to get two groups beavering away on the same issue."

As mentioned, there appears to be a notable lack of information flow between CNO/CCITT and SCOT, even though a proposal exists that the work of the two groups be harmonized. There appears to be less co-ordination between CNO/CCITT and CNO/CCIR than one might expect, especially given the reorganization of work between the two parent organizations CCITT and CCIR, and little operational contact between CNO/CCITT and CNO/CCIR national study groups. But in all of these case, many of the same companies, and in some cases, the same individuals are involved.

More serious is the issue of the CCITT standards (recommendations) themselves. As mentioned, in order to reach consensus on them, CCITT delegates incorporate many options within the standard itself, with the result that the standard is sometimes more of a framework than a usable document until further work is done. As well, until the last few years, it has been suggested that more attention was sometimes given to the assignment of study questions to one study group or another than to the work itself. Study groups lacked the flexibility to add or subtract standards related work to their agendas between CCITT meetings. These situations were rectified in some study groups, and now a proposal has just been accepted to create a strategic management capacity (TSAG) within the CCITT itself, allowing for formal co-ordination of standards development work between meetings and increasing the responsiveness of the CCITT to the needs of the market and users. Proposals for its detailed implementation are currently being considered. Historically, however, the production of recommendations by CCITT has been slow, lagging behind the needs of industry and the dynamics of the sector. In this context, regional and/or national standards development activities have been important, although in some instances,

standards are also developed by individual companies. The result has been that standards consistent with CCITT recommendations but not identical with each other can emerge in different contexts and that many standards do emerge independently of CCITT.

The opinion that Canadians "participate actively, competently and effectively in CCITT for good international standards, and then come home and implement T 1 or national ISDN standards" was cited earlier. Another person consulted called T 1 "the standards machine" and suggested that few CCITT study groups could match or compete with its initiatives. To some extent, these comments are unfair. CCITT's standards activities cover a broader span than those of T 1, and participants gain much that cannot be quantified as "standards" through their involvement in CCITT. Perhaps most important, especially in recent years, T 1 has made a commitment to working closely with CCITT recommendations. Notwithstanding their shortcomings, the CCITT recommendations are an essential international point of reference for all telecommunications standardization. Indeed, one way to understand the emergence of regional and/or interregional organizations is not as a competitor to CCITT (although this has been suggested) but as a necessary complement to it and a mechanism for ensuring that the actual standards being used are harmonized both internationally and between countries and regions.

(f) The Canadian National Organization for CCIR:

Like CCITT, the CCIR is a consultative committee within ITU, and like it, it operates in Canada through a Canadian National Organization. The structure and responsibilities of the two groups are parallel. Both CNOs prepare Canadian contributions, and are chaired by government officials. CCIR contributions are officially "authored" by government, however; company names do not appear on the contributions. Both CNOs conduct their work in conjunction with study groups of their "parent" organizations, CCITT and CCIR, relying on national study groups for contributions. Historically, the CCIR has dealt with the radio spectrum, its allocation and management. This has included standardization of equipment and systems.

Of the one hundred and fifty four participants in national study groups identified for this study (information was lacking on a small number of participants), eighty-nine were government

officials (from a variety of departments and government-related bodies). One person suggested that the CNO/CCIRR technical groups were "almost exclusively from government, although Teleglobe is an active contributor." This high proportion of government participants reflects the mandate of the CCIR in dealing with international conventions (treaties) concerning spectrum allocations. Of the other sixty-five (mainly industry) participants, twenty-one were from companies that were neither carriers nor associated with the carriers. Ninety-nine participants were active in one committee only; fifty-five in more than one. Of the latter, thirty five individuals were each active in five or more study groups.

There are eleven national study groups in Canada, some more active than others. One of their international chairmen and two of their vice chairmen are from Canada. Of the national study group chairmen, seven are from government organizations or crown corporations, three are from Telecom Canada and one from Teleglobe. Among the working parties and technical group chairmen (sub-committees of the study groups of the CCIR) seven out of seventy are Canadian. Of the national co-ordinators for these working groups, fifty-three are from government (or related organizations), five are from Telecom Canada, two are from BNR.

Two changes are in process in CCIR, both of which involving active Canadian contributions. The first deals with the often technology-driven nature of standardization and spectrum management in the past, a situation which, some people argue, created standards for which there was insufficient market or practical justification. CCIR is now committed to making its work program task-oriented, with study committees responsible for co-ordination. It is intended that work planning would start with a service or system concept, move to the development of the overall network and service architecture and the identification of interfaces, finally focusing on the detailed and specific linking of tasks.

The second change deals with the relationship between the work programs of CCIR and CCITT (and their national study group contributors). In the new structure, all standardization activities, including those directly connected with radio communication, would move to the standardization sector operating under CCITT, while matters concerning frequency allocation, spectrum management and the operation of radio systems (including radio stations) would be in the

radiocommunications sector, under CCIR.

It is not envisioned that any study groups would change location, nor that any one study group would move from one sector or organization -- CCIR to CCITT or vice versa -- to another. Rather, about one hundred and fifty questions now considered by the study groups within CCIR would be taken up instead by CCITT study groups. Even when this is done, however, there will still be matters for which a clear demarcation between standardization and radiocommunications is impossible. A procedure for joint efforts and for continuing review of the allocation of questions is proposed.

How these changes will affect the work programs of the two CNOs in Canada remains to be seen. Certainly, no one currently believes that a major effort is required to accommodate the changes. Indeed, it was suggested by one person that the proposed changes only dealt with what were known to be overlaps and duplication in the existing work programs of the organizations. That said, the convergence of the technologies, and the considerable overlap of industries working in both sectors suggests that further rationalization may still be required.

CNO/CCIR is, as noted, an "upstream" organization. To some extent, its work complements the interests of RABC. That said, the two organizations are associated only through the limited overlap of their memberships and through internal communication within the Department of Communications. Given their somewhat different focus, membership and interests, an explicit "upstream-downstream" relationship between these groups is not likely. Similarly, the two CNO's are connected through the involvement of the Department of Communications and through the overlaps in their memberships. But different branches of the Department of Communications are involved in CCIR and CCITT, and a formal working relationship between the work programs of the CNOs seems unlikely in the immediately foreseeable future. There is limited reason, except inasmuch as technologies are converging, for a close working relationship between CNO/CCIR and SCOT, SCOT or TAPAC.

(g) Canadian Interest group on Open Systems:

CIGOS is not a standards development or even advisory group, but was established to promote a particular standards framework, open systems, in Canada. The original impetus for CIGOS came from government, but CIGOS is private-sector organization with both government and industry participants. It is one of several groups internationally and in other countries devoted to promoting open systems, but unlike several of these, CIGOS does not currently engage in developing profiles. Its role is limited to the dissemination of information, encouragement of "upstream" work on the part of its members, lobbying to ensure mechanisms (such as a registration authority and conformance test centre in Canada for OSI-related products and systems) are in place to support OSI adoption, and OSI promotion among Canadian industries.

As of November 1991, CIGOS had thirty-five members. Nine of these were government or government-related bodies, five were consultant companies, and seventeen represented industries (several of which are research, rather than production oriented companies). Most of the industry membership was from individual companies, as opposed to trade organizations. Of the industry members, just less than half were from multi-national companies headquartered elsewhere. There is some indication that membership has not grown in the past year and that dues are owing from several industry members. For the last year, CIGOS has been relatively inactive, with the exception of producing a new strategic plan, because of financial constraints introduced by low conference attendance the previous year.

Many commentators, including some associated with CIGOS, have said that OSI is "at a cross-roads". To be sure, as a paradigm or approach to standards, the OSI initiative has had unparalleled success, reshaping how standards development is oriented. As a practical reality, however, open systems remains less than fully realized. The broad scope and ambitions embodied in OSI, the existence of competing standards frameworks, the large task of creating profiles, the large number of actual OSI standards required, the relatively small number of OSI standard-based equipment available and the continuing existence of proprietorial standards are among the factors bringing OSI to the crossroads. All of these factors are international in scope; the future of both OSI (as an actual body of standards) and the success of OSI promotion is not determined within

Canada.

In Canada, however, the situation is not encouraging. In the CIGOS 1991 newsletter, it was suggested that "widespread product installation seems illusive". But this is a "catch-22" situation. Without organizations like CIGOS, the ambitions of OSI will not be realized. But because OSI is more of a theory than a practice, support for such groups is difficult to achieve, especially given the availability of other, sometimes competitive standards paradigms and promotion groups.

In theory, open systems (or something roughly comparable) are essential if the full benefits from information technology are to be realized within industries dedicated to being flexible in their approach and fully responsive to the market. As an approach to standards development, open systems help prevent waste, duplication of effort and/or single-vendor control. But without a mechanism to identify OSI standards-based equipment and systems, without inter-operability and conformance testing, open systems are not likely to become successful. CIGOS and organizations like it have an important role to play in promoting not only open systems -- as an approach -- but adequate profiling activities, the development of new standards and equipment and registration of equipment (accreditation of other registration systems). Without their efforts, or efforts of similar or complementary groups, OSI will not be successful.

These are difficult times, as no one need remind both governments and industry. The approach to open systems may have significant implications for most standards development, and the need may be recognized both for OSI standards and for organizations like CIGOS which support, promote and disseminate them (ensuring a Canadian position is put forward). But when limited resources are available, short term and practical considerations outweigh other commitments. As a recent OECD meeting in Tokyo, several delegates were pessimistic about the future of OSI. Not surprisingly, an organization in Canada, even one working tirelessly to promote OSI, feels the pressure. Its finances constrained, its work program consequently curtailed, it nonetheless struggles to fulfil what most agree is an important mandate.

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Chapter Four

The "Facts of Life"

It will make little sense to comment on the work programs of the seven designated standards organizations and their potential convergence and overlap, without first describing the circumstances within which they operate. These are "the facts of life". [1] In themselves, they are neither good nor bad. Rather these "facts of life" have evolved just as the standards organizations have evolved in relation to factors other than the co-ordination, or lack of it, among the organizations.

Eight "facts of life" will be discussed, drawing upon the material in chapters two and three. At the conclusion of this discussion, their implications for the work programs of the seven designated organizations will be identified.

l. Members of the Standards Community:

(a) diminishing human resources:

Even the most casual observer would note the significant overlaps among the memberships of the various standards organizations (including the seven of particular interest and others described above). Although not identical, the lists indicate that the same companies and individuals play significant roles in most groups. Many benefits flow from this arrangement. Communication among the groups is often accomplished informally. At the same time, it is worth noting that the standards community is highly dependent upon the long-standing contributions of a very few individuals who are often quite senior in their field. There is little evidence of new members or sufficient numbers of more junior people taking up the responsibilities for the coming years.

(b) potential new contributors:

Also worth noting is the relatively small number of potential new contributors to the standards community. New contributors include those companies and industry organizations with a stake in IT&T standardization which have, thus far, not participated. The views of these potential new contributors were solicited in a series of regional meetings hosted by the SPO. Whether the barriers to their participation are inevitable (the costs are significant, a "free rider problem" is given, the benefits from participation are often indirect etc.) or whether they are instead a result of inattention paid to the needs of the wider industrial community are both questions addressed in the Hall report. The fact remains that the IT&T standards community is currently a very narrow one, with the result that new participants are not likely to be available to contribute to sub-committees, technical work and strategic management functions in the immediately foreseeable future.

(c) the limits of a voluntary system:

The standards community takes pride in the fact that it is dependent upon volunteers, and so it should. Many individuals have contributed time and resources far in excess of the demands of their employers. At the same time, "volunteer" has a specific meaning in the standards community. It refers to the fact that no central body funds standards participation (with the exception of the SCC funding for international participation, funding which has recently been curtailed). Governments, trade organizations and companies must each allocate participants and other resources to standardization. The funding of participation is highly decentralized (which means, among other things that it is impossible to calculate the costs of standards activities).

For many years this "voluntary", decentralized situation was adequate; the standards community has been well-served in part because its access to resources is so tightly matched to the benefits derived by the governments and industries. But governments, trade organizations and companies are now undergoing a reassessment of their deployment of resources. Standards activities and memberships in various standards organizations have come under close scrutiny. It has become apparent that it is hard to "prove the benefits" of standards participation. More

importantly, many of the most active companies are in a position to rationalize their memberships and participation by being involved in other jurisdictions and/or organizations. And for governments intent upon down-sizing, it is not uncommon to ask why government, as opposed to industry, should carry major responsibilities for standardization.

(d) a crisis in the making:

Some of the most active technical sub-committees still continue to draw full attendance. Most of the seven designated organizations, and others including TSACC, still continue to attract active participation. Problems show up in many other subcommittees, where the almost heroic efforts of their chairmen fail to generate participation. Furthermore, ever increasing demands are being made for further participation (especially as the number of upstream organizations proliferate), as the traditionally slow standards process quickens to respond to the dynamic nature of the industry. It is increasingly very unlikely that all, or even the most urgent demands can be met.

2. Types of organizations:

(a) who gives direction to participants:

Even though there are important differences among the seven designated standards organizations, they have much in common. First, for none of their members is standardization the primary focus or concern. In each case, corporate priorities and agendas constrain and give direction to participation. This means that even if the work programs of the seven standards organizations were all highly productive and well-co-ordinated, neither participation nor any particular contribution would be independent of other variables, nor is any decision ever simply the results of agreements reached within the room. Second, as noted earlier, many members are from multinational companies, which have the option of operating other jurisdictions to further their standardization goals. In other words, the standards organizations can never take the contributions of their members for granted, nor are good procedures ever a guarantee of consensus.

(b) standards committees as spheres of influence and interests:

In fact, it makes most sense to view standards organizations as separate spheres of interest and influence. Each draws together a somewhat different group of individuals, representing the particular interests of their employers, into a situation where patterns of influence and on-going agendas have long been established. Even when the issues change, participation is maintained if the sphere of influence retains its importance. Indeed, an organization can "lose" its original mandate, or make minimal contributions to the technical work of standardization and still retain its active participants if it remains an important sphere of influence for its major contributors. In fact, the members of standards organizations have four quite different reasons for participation. They may participate to contribute to standards development and/or to keep a watching brief on developing technologies and standards, and/or a watching brief upon other members of industry or government and/or they may participate to delay standardization. The most important reasons for attending meetings sometimes have little connection to furthering progress on specific items on the agenda.

(c) standard groups as "bottom up" organizations:

Standards organizations are "bottom up" organizations. This means that people "vote" with their feet. They join the organizations if and when they offer particular advantages; they participate in those technical deliberations that are of direct interest (for as long as they are of interest); they readily abandon committees or organizations when the costs of participation outweigh the benefits. One person called this a "process of natural selection" and others echoed the sentiment that "what is not feasible in a voluntary structure is the concept of redirection of resources -- which are volunteered for a specific purpose not for general use -- under third party direction." Given this situation, it is impossible to predict which organizations or committees will attract an active participation simply by studying their agendas. Nor is there likely to be an effective over-arching set of priorities for any group (in spite of efforts to develop strategic mission statements and plans in some organizations) or for the standards community as a whole. Nor is an organization likely to be successful simply because everyone agrees in principle that its existence would be beneficial.

(d) strategic co-ordination and management of the standards process:

The advantage of the "bottom up" nature of standards organizations is that a quick scan of their membership indicates the "market demand" for the spheres of influence and interests they represent. The disadvantage of the "bottom up" approach is that it makes any Canadian standards strategy exceptionally difficult, even seemingly inappropriate within the standards community. Given the increasing scarcity of resources precisely when more are required, the inevitable mismatch between the character of standards organizations and the need for strategic co-ordination, this is a serious problem. Strategic management committees have been introduced and studies commissioned by individual organizations, but it is the assessment of this author that the situation will not change within the standards organizations themselves, at least not in the immediately foreseeable future. More likely, change will be introduced when people "vote with their feet" and through the catalyst of TSACC.

3. The Complexity of the Standards Community:

(a) complexity is a world-wide problem, not a Canadian one:

It is probably no consolation to members of the Canadian standards community that the array and relationships of standards organizations in other countries are no less complex than they are in Canada. There are, as the overview of the standards environment in this report indicated, multiple levels of organizations. The same organizations (for example T 1, and even TSACC) are represented on more than one level. Within any one level, the organizations can be very different from each other in terms of their history, procedures, membership, mandate or constitutions. Finally, organizations that look alike are often very different in practice.

(b) complexity in the Canadian situation:

This situation is repeated in Canada. On one hand, SCOT and SCIT look alike; they are both committees of CSA dealing with different but potentially complementary IT&T mandates. A closer study reveals differences in their membership, mission, relationships and clientele. Close working relationships between them are infrequent. On the other hand, obvious differences exist between TAPAC and SCOT, but one could envision a situation where their missions, clienteles and activities were either merged or much more tightly co-ordinated. Then, the new committee looking at interconnection standards is based on the same rationale (ensuring standards are not used as anti-competition barriers) as TAPAC, but no serious proposal currently exists for merging their functions because they each attract participants with different interests. Furthermore, on paper, JTC 1 looks somewhat like CCITT and the two CNOs are similar, but the differences between JTC 1/SCIT and CNO/CCITT are striking as are the differences between the CNOs. Finally, some Canadian organizations are represented in more than one layer (for example Treasury Board, CBTA etc.) if the individuals representing them play several different roles in the standards community.

(c) overlaps, convergence, duplication and missing elements:

CCITT and CCIR historically have had different mandates, so overlaps in the work programs of their committees should be avoidable. In practice, such overlaps are sufficiently common that the proposed reorganization of all standardization activities under CCITT (removing them from CCIR) is not seen by some interviewed as creating any new workload for the existing CCITT committees. But in general, it is hard to assess the degree of overlap in the work programs of the Canadian standards organizations especially when many other "unofficial", "ad hoc", proprietorial or other standards related organizations also operate either in Canada or with significant Canadian participation. Furthermore, whenever a "high interest area" is declared, officially or otherwise, it impinges upon the work of several existing committees (which then often add work items to their agenda) and/or a new group is created.

In other words, overlaps and gaps do exist but they are very difficult to measure. Communication and co-ordination are not entirely lacking lacking. but they mainly occur when individuals belong, as they often do, to more than one group and people "vote with their feet" in assessing priorities for their participation. They are also the product of jurisdictional issues within and among the parent international organizations.

If it were possible to start again, it is unlikely that the current mix of organizations would be selected, or that the relationships currently among them would be retained, especially given the convergence of technology now occurring. Of course it is not possible to start again That said, there are some elements to this complexity which although a product of the history of the organizations, are not inevitable. They add little value to the standards community and they can be changed.

4. Dealing with Complexities - the "Parent" Organizations CSA and SCC:

(a) the consensus process in the voluntary standards sector:

The membership criteria and procedures of the private sector standards organizations, CSA and SCC, reflect their broad span of standards activities. That these are complicated, and often slow to produce the consensus necessary for standards is of little concern if the standards themselves deal with products or services already in the market and likely to be used for a considerable period after standards have been developed. The CSA/SCC procedures and decision rules are designed for industrial sectors where there are many interested parties serving as the "talent pool" for balanced committee membership, and eventually as the market for the standards themselves. They process is slow because reaching consensus is always slow, and because "fairness" is as important to the participants as is speed. Finally, the membership criteria and procedures for decision making in CSA are also designed to provide assurance to consumers about the safety and/or reliability of the standardized products.

(b) The IT&T sector is unique:

Almost none of these conditions exists within the IT&T sector. The IT&T sector itself is highly both segmented and dynamic. Products have a limited market life-span, and increasingly standards are developed before -- often well before -- either specific products or systems. For different reasons in the IT and telecommunications fields, there are only a small number of directly interested parties, available to serve on committees and committed to allocating the resources necessary to sustain the standards process. More important, there is a very limited market for the standards themselves. Finally, issues of quality assurance and safety are handled, for the most part, under the auspices of government committees. In other words, membership criteria and procedures necessary for other industrial sectors can be, and often are highly burdensome, and even controversial or irrelevant when applied in the IT&T sector. This is not an argument against reliance upon the private sector standards organizations. On the contrary, it deals only with the

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problems caused by the speed (or lack of it) and complexity of CSA/SCC procedures, which were developed with other sectors in mind. The problems are sufficiently serious however, that a few people were quite discouraged, one expressing a view (not shared by this report) that "They cannot handle it any other way"; the situation is "a lost cause".

(c) the standards organizations are themselves market-dependent but there is only a limited market:

As noted, the private sector standards organizations depend upon the sale of standards for a significant portion of their activities and support of their standards committees. (One person suggested, however, that marketing efforts on the part of CSA were lacking). Again, this model works well in some sectors, where a large market exists for the standards. In both the IT and telecommunications sectors, however, the sale of standards has little actual market reality. Those who are engaged in standards development themselves constitute the primary market (there is a secondary and important market among Canadian industries, but many IT standards, in particular, are too specific for their needs) and, in general, they do not need to purchase standards in order to have access to them.

(d) unlikely competitors:

That IT&T standards are purchased is a sign of the commitment that exists to the standards process. But in the IT sector represented by SCIT, there is considerable question about the need for specifically Canadian standards, i.e. standards adapted or adopted by the CSA, because there is another source of the same international standards, in this instance the SCC which sells the ISO (international) standards directly. In this case, SCC and CSA are competitors for each other in a market with few potential consumers. In the telecommunications sector, many of those engaged in CNO/CCITT and CNO/CCIR have access to the relevant standards without the mediation of CSA simply by virtue of their participation. (another "catch 22"; only if standards are purchased from CSA is money available from the parent organizations for domestic committees preparing contributions). As things currently stand, there is a limited market for the sale of many telecommunications standards through CSA.

(e) disseminating other standards:

A large portion of standards used in Canada are not generated by the Canadian voluntary standards organizations or by ISO. Access to these standards is difficult for those who are not members of the relevant standards organization elsewhere. In the best case scenario, SCOT in particular, serves as the distributor of these standards by adopting these standards as Canadian standards, and ensuring their dissemination. But because SCOT is a CSA committee and part of the National Standards System, because of the administrative, financial and copyright problems mentioned above, and because of the limited scope and capacity of SCOT's current work programs, there are serious impediments to making the full array of relevant standards easily accessible to Canadian industry.

5. Dealing with Complexities -- The Other "Parent", the Department of Communications:

(a) the many roles of the DoC:

Each standards organization has its own history. This is as true for those developed within or operating under the auspices of the Department of Communications as for any others. Thus it is not surprising to find the "standards portfolio" split within the Department of Communications, and the expertise necessary for each committee or type of participating located in a different branch or division.

(b) one department, many needs:

In theory, it would be simple to combine all of the standards work within the Department of Communications into a single portfolio under one assistant deputy minister (rather than the current three), but in practice, this combination is not likely to occur in the immediately foreseeable future. Notwithstanding the comments often made about the convergence between radio, telecommunications and IT, the fact remains that different expertise is required for each type of participation, the functions of the various groups within the DoC are often very different from each other, and the various groups within the DoC have quite different histtories and orientations (e.g. to international relations, to CRTC mandated competition decisions etc.).

(c) rationalizing department involvement:

Several years ago, the problem of standards activities co-ordination within the Department of Communications was tackled with the establishment of the Standards Program Office, even though thus far, the SPO has not been positioned (within the DoC) to be as effective as possible. TSACC, although a private sector council, also makes the important contribution to bringing all of the major government IT&T standards participants into the same forum. And a new committee of

assistant deputy ministers will greatly benefit the situation. There is no question that the problem of co-ordination within the Department of Communications is recognized, in other words, and that the Department is taking steps to rationalize its own standards committees and standards participation.

(d) the involvement of other departments of government:

If expertise were the only determinant of governmental IT&T standards participation, the Department of Communications would continue to be the main government department involved. But increasingly, standards are being viewed as key elements to industrial innovation policies and initiatives. Moreover, many other government departments are already involved, for example with TBITs [2]. In the case of TBITs, close co-ordination does exist between those addressing standards deployment and procurement issues (under the auspices of the Treasury Board) and the Department of Communications. This situation is mutually beneficial. In the case of industrial innovation policy, however, the problem of inter-departmental co-ordination is a new one. It demands attention quickly if more "layers", government and further complexity are to be avoided. This is especially true because some portion of funding for standards activities (in general) already comes from other departments, and because standards organizations are themselves seeking out new government participants (other than the Department of Communications) to resolve their continuing funding problems.

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6. "Upstream "activities:

(a) the increasing importance of "upstream" work:

No one would doubt the very important contribution that Canada and Canadians have made to "upstream" organizations, particularly but not exclusively in the international organizations. Nor would anyone question the increasing importance of "upstream" activities in the era of globalization. In many countries, "upstream" activities have all but usurped the roles traditionally played by "downstream" or national standards bodies. In effect, in these countries, all attention is focused regionally or internationally and all national activities are organized to promote contributions elsewhere.

(b) Canada's special international profile a product of individuals not organizations:

With respect to the international organizations, Canada is well served "upstream" by JTC 1/SCIT and the two CNOs, but this situation is a little more complicated than it appears. Many of the major contributions internationally occur quite independently of the CNOs, or only "officially" in conjunction with them. For example, the very important role played by Canada in promoting change within the CCITT was a product of several key individuals. To be sure, these individuals worked through the official committees, but absent these individuals and it would be unlikely that the same efforts would be expended or as successful.

(c) Public and private sector contributors involvement in "upstream" work:

Although under the auspices of the government (as must be the case with contributions to Treaty organizations such as the ITU), the CNOs depend upon an excellent working relationships with the private sector. But in few instances, private sector participants have felt "cut out" by the public sector officials who hold the official mandate for preparing contributions. And in other instances, the CNOs appear to act primarily as "flow through" organizations for their industry

participants, so much so that one wonders why (other than for the formal or official reasons) government officials participate at all. The relationship between government and industry, and the role of government as an active participant are both matters requiring further assessment.

(d) Changes "upstream" are slow to be reflected domestically:

Significant changes are occurring in the international organizations for which the CNO's prepare contributions, but these same changes have not yet resulted in comparable changes domestically within and between the CNOs.

(e) "upstream" to what?:

In spite of the important contributions Canadian make to the international organizations (and the benefits derived from international participation), the fact remains that the primary source of many telecommunications standards in Canada is not CCITT but North American or American organizations. As noted earlier, this is because, for many (but not all) companies the most important markets are North American, and the need for harmonization within the continent outweighs other considerations.

(f) representing Canada in other "upstream" organizations:

The CNOs are designed to work with the ITU committees, CCITT and CCIR. The JTC l/SCIT committee performs the same function for JTC 1. But as indicated in the overview of standards organizations, ISO and ITU (and their committees) do not exhaust the list of "upstream" organizations. Aside from the regional and inter-regional groups, there are a multitude of other groups within which Canadians -- if not Canada and/or Canadian standards organizations officially -- play a very significant role. Some of this participation is organized informally and requires little further attention or co-ordination in order to benefit Canadian industry. But in other cases, the following questions are remain unanswered: (1) which organizations require an "upstream" presence from Canada? (2) how is this presence or participation to be organized? (3) to what extent are informal arrangements sufficient, and can they be maintained in the face of resource

constraints? and (4) how should *Canadian* positions be developed, assuming they are required, and who should develop them?

(f)T 1 is not the issue:

If this "upstream" issue concerned only T 1, several initiatives now underway might well resolve it. For example, placing the efforts of T 1 in the context of an Americas symposium and thereby creating a regional presence (with genuine "upstream" participation from Canada, one assumes) would allow for debate about the problematic issues affecting T 1 without creating another standards development body. Or, to the extent that T 1 participation from Canadian companies is, in fact, co-ordinated unofficially, on an ad hoc basis prior to important T 1 meetings, then the problems are already resolved. Or to the extent that T 1 and similar groups increasingly co-ordinate their actions with those of the international organizations, the issue disappears. But T 1 is only the "tip of the iceberg". What about Canadian participation in TIA, ETSI, ITSC, in the work programs of GSCC and its EDH committee, in ATSS, in all the other international and national bodies generating standards of interest to Canada? Do they demand an "upstream" presence in Canada comparable to JTC 1/SCIT or the CNO's?

(g) whose needs and priorities should prevail -- continuing problems:

There are compelling reasons for **not** creating more committees or organizations to deal with the expanded "upstream" demands. To some extent, the current situation works adequately and the "makeshift arrangements" (for ensuring at least co-ordination of a "Canadian" position) suffice. As the cliche goes, if it is not broken etc. At the same time, however, considerable dissatisfaction does exist, even if it is a minority view, about the lack of *Canadian* representation for much "upstream" activity, and about the unofficial, and occasionally quite ad hoc and unco-ordinated "upstream" participation that does take place outside the context of SCIT/JTC 1 and the CNOs (and occasionally in the CNOs). This dissatisfaction is not easily resolved, in part because it does not reflect the consensus of all participants in the Canadian standards community but equally because the complexity of the "upstream" organizations themselves precludes an easy rationalization of their Canadian contributors.

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7. The "downstream" situation:

(a) the European model:

As noted, in many countries especially in Europe the "downstream" organizations seem to have lost most of their reasons for existence. Standards development takes place at a regional level; national standards are simply adoptions of regional or international ones. As also noted, in an era of increasing globalization, national standards development is quite likely to become less significant. At the same time, it would be mistaken to apply the European experience too directly to non-European countries. Moreover, no one would seriously claim that national standards activities have become unimportant in Japan or the USA or even suggest that European community standards are adopted in every case by its member countries.

(b) what is the purpose of "downstream" activities in the Canadian case:

Even so, the Canadian situation is somewhat anomalous. Unlike the small non-European countries, Canada has always been more active in standards development activities both domestically and internationally than its size or economic importance dictates. Furthermore, Canada operates within quite a different "regional context" than its European counterparts. But the questions remain: is there benefit to putting a Canadian cover on a standard generated elsewhere in order to sell it in Canada as a Canadian standard? Conversely, to what extent should Canada be even minimally "out of sync" with standards developed elsewhere? Are the "upstream" contributions made by Canadians premised on the existence of downstream organizations operating effectively in a domestic context? Should Canadians attend to the lack of standards domestically before paying so much attention to "upstream" work? These are difficult questions to be sure, and the answers are bound to be controversial.

(c) avoiding the down-side of 'downstream" activities:

In the assessment of this report, it serves no worthwhile purpose (other than creating a non-tariff barrier to trade) for Canadian standards organizations to expend efforts adapting or revising standards that consequently become different from standards adopted internationally and/or in the North American market. Similarly, it serves no worthwhile purpose to attach a Canadian cover to an ISO or T 1 standard *simply* to generate revenue for CSA, when the same standard -- minus the cover sheet -- is readily available for sale from its original source or when other equally important standards are not made available. As will be discussed below, the rationale for many "made in Canada" and performance standards is quickly disappearing in the new era of globalization. And too often, the "downstream" organizations fail to produce standards in a timely manner, functioning instead as the locus for controversies.

(d) For some, however, the need for Canadian standards remains strong:

But there is another side to the debate. First, although it is true that Canada is moving into a new era of globalization and a new economy, it is also true that many Canadian companies operate within the old order. For them, domestic markets are a first priority and Canadian standards are very important. Second, the point has been made that international standards leave much to be desired. Too often they contain so many options that they are of limited use to Canadian industry. Someone must develop profiles, and/or make choices to produce workable standards. This is a traditional role for "downstream" organizations, not unrelated to the value of the "upstream" contributions their members also make. Finally, the benefits from "downstream" work are considerably different for the subsidiaries of American multinationals than they are for those whose primary markets lie either primarily in Canada or outside North America. For the latter companies, Canadian "downstream" organizations are essential because through them, decisions can be made about which profiles or standards are preferred. (The issue of whether "made in Canada" standards -- standards unique to the Canadian situation -- are necessary or desirable as an industrial policy is a different one. It will be addressed in the next section.)

(e) Other often neglected "downstream" roles:

There is a different dimension to the role of "downstream" organizations. Even if there was no need for specifically Canadian standards (a position this report will not advocate) the need for dissemination of standards would remain critically important. Indeed, information on standards and standardization is a prerequisite to effective participation in global markets, and many companies are not in a position to garner this information for themselves. Even for those already active in standards development, the flow of information and the complexities of the various groups undermine their capacity to realize benefits from standardization. For these reasons, "downstream" organizations are, or can be very important in promoting and disseminating information on standards and standardization to those outside the immediate circle of the standards community. Unfortunately, given other demands upon resources, this is a task often left aside.

8. Made in Canada standards:

(a) Standards and competition:

It has long been established that standards can function either as barriers or facilitators for competition, and thus in any newly competitive sector in particular, the need for close scrutiny of standards is well-recognized. As the "terminal attachment" standards indicate, the process of matching telecommunications standards to the "competition" decisions of the CRTC can be a productive one for all concerned. Such standards are best developed under the auspices of government, because they are usually mandatory and because an "umpire" is often required. But once the ground rules, revisions and new standards (if required) have been put into place, the rationale for further "made in Canada" standards, and for the committees necessary to develop them, should be reexamined.

(b) Standards and performance:

Canada has a long tradition of setting performance or efficacy standards in many industrial sectors. This tradition is manifest in the activities of CSA, whose "mark" provides an assurance to the public about the quality, efficacy and safety of the standardized products. It is manifest in the testing of drugs and pesticides, where in contrast to other countries, Canadian government regulators insist on efficacy testing in addition to safety testing before registering drugs or pesticides. Thus it is not surprising to find performance or efficacy testing in conjunction with telecommunications standards, particularly where such standards are deemed to be mandatory. The original rationales for such tests were: (1) that electrical equipment is involved (safety issues) or (2) that equipment attached to a network could undermine its performance or viability. Today a further rationale is cited: the Europeans appear to be introducing more mandatory performance standards and certification, and it disadvantages Canadian industry to not follow suit..

But performance or efficacy standards (and the certification process that accompanies them)

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have become much more controversial in recent years. In the North American market, they are seen to disadvantage Canadian industries by requiring more tests be conducted in Canada (with the attendant delay). Equipment that is untested is readily available from over the border; the situation is impossible to police. With increasingly digitalized telecommunications systems, many people also argue that performance standards are becoming technically unnecessary. And finally, as others are quick to point out, performance standards (and time consuming certification procedures) all too easily can be used as non-tariff barriers to trade. There are too many important public policy issues involved in any suggestion to abandon performance standards (in total or in part) to be dealt with in the context of this report, issues that extend far beyond the IT&T sector. Nonetheless, it seems likely that "made in Canada" (performance and efficacy) standards will become increasingly less important, eventually disappearing. If this occurs, it will require a fundamental reassessment of current legislation and some Canadian standards organizations currently engaged in developing performance standards.

(c) standards for uniquely Canadian needs:

Are "made in Canada" standards necessary to meet the specific needs of Canadian communication systems? Canadian telecommunications systems have developed somewhat differently from systems in other countries, and they have specific standards requirements. Moreover, many companies orient themselves exclusively to domestic markets, and gain little from the delays imposed when standards development is responsive to the time-lines and priorities of other countries, as is the case even with international standards. In theory, these arguments should become increasingly untenable. Canadian telecommunications systems are evolving, and as this happens, their unique characteristics are likely to disappear. Furthermore, even if Canadian firms are oriented to domestic markets, their competitors are not. Consumers regularly engage in comparison shopping, and companies producing for the domestic market only (with uniquely Canadian standards) are likely to fare poorly in such a situation. In practice, however, the need for made in Canada standards still exists, at least in the short term. There are many areas where standards development lags behind product and systems development. Canadian made standards can fill this gap, assuming they can be made in a timely manner. (But this too is more often true in theory than practice.)

(d) standards as industrial strategy:

There is a fine line between using standardization as an integral part of a Canadian industrial strategy and using standards as a non-tariff barrier to trade. Nonetheless, there are situations where it is not only legitimate but indeed quite important to take standards initiatives to promote Canadian industry. If, for example, the product or system is new, and reflects an area where Canadian industries are uniquely positioned to take leadership, a rationale exists for a "made in Canada" approach. This holds true, however, only to the extent that an international standard is slow to develop, in other words only when there is a "standards vacuum". It is also contingent upon significant efforts being made to ensure that the Canadian standard is compatible -- or capable of being adapted to be compatible with -- an eventual international standard. After all, nothing is less conducive to successful industrial strategy than an "orphaned standard" and the investment in products and services accompanying it.

(e) taking leadership:

It would be shortsighted not to take leadership in developing standards in those very special instances where a short term benefit can be gained from early entry into the market or where standards needs cannot be met otherwise. But it must be recognized that leadership is a high risk strategy for all concerned. It can only be successful when significant consultation occurs between government and industry to ensure adequate information for decision making, and when the risks involved are fully shared. Especially in the case of using standards in an industrial strategy, special efforts are required. Government-industry partnerships and research consortia are likely to meet the need better than the long-established Canadian standards organizations.

(f) when should others lead?

Overall, the rationale for "made in Canada" standards remains persuasive mainly only in the short term. Even so, it involves considerable risk for everyone involved.Especially in light of

increasing resource constraints, a reassessment of the need for "made in Canada" standards is required. To be addressed are: (1) when standards should be used in conjunction with industrial strategies; (2) the costs and benefits of performance standards; (3) the timeliness of the standards effort in conjunction with CRTC competition decisions; and (4) the work programs of organizations devoted primarily to meeting uniquely Canadian needs.

Chapter Five

A Canadian Standards Strategy

What recommendations follow from the analysis of the standards environment, and the mandates and work programs of the designated standards organizations? What would it require to create something that could reasonably be called "a Canadian standards strategy?" This chapter draws upon the material discussed thus far to reach some conclusions.

(a) Work programs never developed in a vacuum:

The work programs of the designated Canadian standards organizations are not developed in a vacuum, but respond very directly to the needs and complexities of other organizations in Canada and elsewhere. The work programs are also not only responsive to the need for standardization. Much of what occurs within the Canadian standards organizations cannot be understood without background knowledge about developments within the IT&T sector (world-wide, as well as in Canada) and within the companies and government departments that contribute participants. In other words, a Canadian standards strategy cannot be developed solely from an examination of the designated Canadian standards organizations, their mandates and work programs.

(b) the coming crisis for the Canadian standards organizations:

Yet essential to any Canadian standards strategy are healthy participating organizations with active work programs. Unfortunately even the current work programs of the Canadian standards organizations cannot be sustained unless new members are forthcoming In light of the increasing new demands for participation being made upon the Canadian standards organizations and their members, this situation constitutes a serious crisis. In the past, similar crises were resolved by the natural ebb and flow of membership in particular orgaanization and the emergence, when

necessary, of ad hoc groups to supplement their work. Today, this response will not suffice. The increasing demands being placed upon the Canadian standards community, the shrinking pool of resources for standardization and the need for a Canadian standards strategy in the face of globalization (not only of IT, and telecommunications but also all industries dependent upon IT&T standards) all combine to create different kind of pressure. They will require a new approach.

(c) overlaps, convergence and gaps:

It is in light of the impending shortage of human resources that the overlaps and convergence among the work programs of the Canadian standards organizations must be understood. There is considerable overlap in the membership of the various groups, and some indication that similar issues are considered -- and occasionally even technical work done -- in more than one organization. Notwithstanding the increasing requirements for strategic co-ordination and management of the standards process (and increasing co-ordination among the organizations), the Canadian standards organizations are likely to remain "bottom up organizations and to continue to operate in a highly decentralized manner, however. In this context, TSACC has a particularly important role to play if there is potential for a Canadian standards strategy.

(d) changes are needed; some are already in progress or well within the range of possibility:

Ironically, while other countries investigate whether to emulate the Canadian approach -- in particular the Standards Council of Canada and the Canadian Standards Association -- the current situation in Canada is not well attuned to the specific needs of the telecommunications and information technology sectors. It is essential that discussions begin about how to adjust CSA/SCC procedures and decision rules to support the work programs of the voluntary standards committees in the IT&T sector. There is willingness on the part of SCC and CSA to recognize problems in the current situation. As SCIT's experience with CSA demonstrates, there is also a willingness to discuss new methods appropriate to the sectors involved. Furthermore, models exist in other jurisdictions about how work programs might be better supported, processed and integrated.

Similarly, resolving the crisis in people and resources depends upon the re-assessment of the government role in standardization (currently in progress, for example, with a consultant's study done for TAPAC), good relationships between government and industry and a commitment to continuing rationalization of the "standards portfolios" within government. These too are part of developing a Canadian standards strategy.

(e) communication gaps:

Any successful Canadian standards strategy is first and foremost a product of communication among those active in the standards environment. At first glance, the Canadian standards environment does not lack information. Individuals and companies are members of more than one group and, assuming they actually participate actively in each group, can provide information links between organizations. The volume of paper, reports from meetings etc. is positively staggering. Moreover, no one questions the need for a clearing house -- a database to supplement and speed up the current paper flow (being undertaken by several co-operating organizations including TSACC, SPO and the Standards Council). On close examination, however, the system is beset with problems of information flow: The very size and scope of the paper flow, the fact that much of its information remains "undigested" and thus inaccessible to those not already aware of it. (Note: Formal standards are abstracted and key word indexes are available by the SCC, but similarly accessible information does not exist for draft standards or, more importantly, for the activities and changes in standards organizations of interest to Canadian industry) The existence of a many different groups means that, in fact, very few people can expect to have command of the information. Interestingly, participants in the Canadian standards organizations would be among the first beneficiaries of a more accessible information flow.

(f) standards and the new economy:

It is widely recognized that telecommunications and information technologies are at the centre of the new economy and the resulting globalization of all industries, but less well understood how this globalization affects -- or should affect -- the mandates, roles and activities of individual Canadian standards organizations. Industry needs are being more sharply delineated; virutally

everyone agrees that standardization must become more "market-responsive". But it is not clear how this situation will be reflected domestically among the Canadian IT&T standards organizations. The new economy and globalization make "strategic planning" within the Canadian IT&T standards environment especially important. No less than the crisis of resources, these pressures for globalization will force change in the Canadian IT&T standards environment.

(g) "upstream" work is increasingly demanded:

In the new economy, the "upstream" component of the work programs of Canadian IT&T standards organizations assumes even greater importance. In today's environment, there are many "upstream" organizations to which attention should be paid. Most fall outside the current work programs or mandates of the CNO's. Some are regional, but others are more functionally oriented or connected to user interests. How Canadian industry is, can (given existing resources) and should be linked to these other "upstream" efforts are all critical questions which have not yet been adequately addressed. Informal and ad hoc groups can be used; TSACC has already played an important role. But the questions remain about which group(s) should be involved, and how decisions about Canadian contributions should be made.

(h) international versus regional orientations:

The Canadian standards environment has long acknowledged the importance of international standardization, and few would underestimate the contribution that Canada has made. Although no one proposes a change in priorities, several contrary pressures exist within the Canadian standards environment. Regional or American standards organizations have been sometimes more important to Canadian companies than international ones. With NAFTA increasingly requiring a regional orientation, regional strategies are essential, especially if they can be made truly regional in their orientation.

(i) assessing the "downstream" need:

Notwithstanding the continuing importance of "downstream" activities within the work programs of the Canadian standards organizations and the need to make standards available quickly for Canadian companies, it is this aspect of the work programs of Canadian standards organizations causing serious questions to be raised, and leading to controversies. Few would argue that the current work programs of the Canadian standards organizations (i.e. their "downstream" activities) are yet fully rationalized, efficient, productive and well co-ordinated. Yet it is worth emphasizing that many of the problems do not lie simply with the organizations themselves nor can they be addressed by any simple program of rationalization.

(j) other downstream roles:

"Downstream" has traditionally been associated with the publication or distribution of standards in Canada, and with "made in Canada" standardization. In fact, unfortunately many other kinds of "downstream" efforts -- dissemination and promotion -- fall outside the current mandates or feasible work programs of existing Canadian standards organizations. These involve consultation with the currently non-participating Canadian industries, educational efforts about the importance of standardization, further integration of user groups and, most importantly, the investigation of feasible means to link the needs and resources of Canadian industries to the standardization process. Attention needs to be paid by current standards participants to developing new mechanisms for involving those less directly affected by standardization in supporting standards work.The SPO is an important tool in this regard, but alone it cannot accomplish the task. Although resources are constrained, adding this new task to the work programs of the designated Canadian standards organizations may have considerable pay off for the standards community and Canadian industry. It is an essential part of any Canadian standards strategy.

(k) reassessing the needs for standardization:

"Downstream" activities sometimes include "made in Canada" standards. It seems likely that both competition-related and performance "made in Canada" standards will continue to be

necessary in the immediately foreseeable future, but a reassessment should take place once "the rules of the game" have been established for competition-related standards. Similarly, there is need for a "costs and benefits" assessment of performance standards and of standards designed for uniquely Canadian needs. It is reasonable to ask (without prejudging the answer) whether the same resources could be used more effectively in the future in light of the new challenges of standardization?

(l) using standards for industrial policy:

Standards can be used as integral components of industrial policy but only in particular circumstances, and in such cases, research consortia and partnerships are likely to be more useful for producing the standards than the existing Canadian standards organizations. This is not a criticism of the Canadian standards organizations; simply none of them was envisioned or is currently mandated and designed to operated with the needs of industrial policy in mind.

Chapter Six

Recommendations

In several instances above it has been suggested that new proposals need to be developed to support a Canadian standards strategy and the work programs of the Canadian standards organization, specifically their efficient operation in a period of increasing human and financial constraints.

It would be tempting to recommend leaving these tasks to government, which has (at least in theory) the resources to support ithem or to consultants who might prepare reports for consideration. Both approaches would be wrong because success in any of these initiatives depends directly upon the willingness of those involved to implement changes.

It would be much more appropriate for TSACC members themselves to undertake the necessary work program related to recommendations in this report (and the two complementary reports) they find acceptable, using ad hoc working groups. To facilitate the operation of these ad hoc working groups, a small supplementary staff working through the TSACC secretariat might be usefully deployed if resources could be found to support it.

The ad hoc working groups might include (assuming TSACC members agree on any one of them) the following:

- Develop a strategy for condensing and packaging information, in order to reduce the paper flow and render information useful to those who do not already have it. This should be done in conjunction with the new database.[3.]

- Initiate and oversee discussions with SCC and CSA to see how procedures, decision

rules, publication and the financing of standards work could be better matched to the specific needs and character of the telecommunications and information technology sectors and the resources available.

- Identify the many potential "upstream" organizations, and discuss how to develop appropriate relationships -- if required -- with them in association with a commitment to international standardization and consistent with the diminishing resources in the standards community.

- Identify broad principles to determine *when* "made in Canada" standards are required, and make recommendations for their speedy and timely development, some of which may not include the Canadian standards organizations..

- Continue explorations about how the Canadian standards organizations might co-ordinate or even eventually merge their work programs in an era of increasingly constrained resources.

Undertaking these tasks would give meaning to the word "advisory" (Telecommunications Standards *Advisory*...) in relation to TSACC. It would draw upon the unique resource created by bringing together all of the major participants in the Canadian standards environment. It would ensure that TSACC, among other groups, represented a clearly defined "value-added" for its individual members and that TSACC becomes an important contributor to a Canadian standards strategy.

It would be easy to overestimate the possible results of such collaboration, however, or to underestimate the difficulties of bringing about change or even agreeing on which changes are necessary and feasible. That said, the focus on what TSACC members might do themselves, rather than on new work programs requiring yet further resources and support, is consistent with the orientation agreed upon by TSACC members and the difficult realities affecting Canadian standards organizations in the immediately foreseeable future.

Report on Mandates and Work Programs
Of Seven Designated Canadian Standards Organizations
Liora Salter

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1. "Facts of life" is a quick way of indicating some features of the standards environment. They are "facts" only in the sense of not being easily changed. This section represents an assessment based on extensive consultations, but the opinions expressed are only those of the author of this report. It is understood that others might disagree on either what constitute "facts" or the descriptions provided in this report.

End notes:

1.."Facts of Life" is chosen simply to indicate that the situations described are not easily changed.

2. A program for the development and adoption of voluntary IT standards within the Government of Canada, co-ordinated through the Treasury Board

3. A working group has now been established and is meeting. It includes TSACC, and its members, the SPO and the SCC.

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