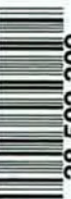


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The Governance of Horizontal S&T: Issues and Options

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The Governance of Horizontal S&T: Issues and Options

Produced by:
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I. Background

This paper is intended as input to the June 10-11 meeting of federal Science ADMs at Merrickville which is to focus on how to improve horizontal integration of federal S&T, without new resources.

The paper draws on the results of interviews with a number of the participating ADMs, plus a review of relevant background materials on the broader issue of horizontal S&T and experience with particular horizontal initiatives.

Horizontal S&T

The experience of the federal science community with horizontal initiatives generally has not been positive. Notwithstanding some recent successes such as TSRI and CRTI, most people would say that the pattern over many years has been one of:

- a general difficulty in agreeing on cross-cutting issues requiring horizontal work;
- relatively few incentives, and some fairly obvious barriers, for individual scientists who wish to pursue collaborative work across departmental boundaries;
- a reluctance on the part of the major science departments and agencies to join their efforts under an agreed, cross-cutting science agenda;
- evidence that horizontal work seems to succeed only when there is new money provided for the purpose.

At the same time, there is an increasing realization on the part of the science departments that the policy and related issues requiring horizontal work – ranging from public security to climate change – are too important to be ignored. Science departments recognize that they cannot insist on new money every time an important horizontal problem comes along. Thus they are obliged to develop ways to do the necessary cross-cutting research within current resources. And they must do this without neglecting essential departmental research and related science activity, and without undermining the accountability of their Ministers for the programs and resources approved by Parliament.

What all this means is that horizontal science raises important issues of governance that must be understood and addressed before decisions can be taken on the resourcing and management of individual research projects.

II. Governance Issues for Consideration in this Paper

Governance is about authority and accountability – who can decide what, what are they accountable for achieving, and how do they go about achieving what they have set out to do? Before reviewing experience and the views of interviewees, it is useful to remind

ourselves of some more general points about the role of officials in the governance of science activities.

1. What can Officials Do?

- We should start by recalling some of the basic features of our Westminster system and their implications for government science:
 - Parliament votes money to Ministers for the conduct of the programs for which Ministers are legally responsible.
 - Parliament does not give money to officials to be spent for whatever good purposes the officials think would be useful. Nor does Parliament wish to see officials pooling funds that have been voted for one purpose in order to fund other objectives, no matter how commendable.
 - If there is a good reason to spend money on horizontal science, then the government should seek the necessary funds for that purpose.
 - *Either that, or Ministers and their officials should satisfy themselves that moneys already voted for departmental purposes can legitimately be spent on horizontal research projects whose aims and benefits fall within approved program authorities.*
 - The latter proposition is the premise that underlies the analysis and recommendations in this paper.
- We should also bear in mind that government science can and should be used to support analysis and options on major policy issues before Ministers. As those issues become increasingly 'horizontal' in character, so too must the science that is used to address them. *The question for departments then becomes how to properly define their S&T vocation in support of their interest in policy files that may transcend the mandate of their particular department.*

2. Deciding on Priorities

- This is clearly key to deciding both what *should* be done by way of horizontal S&T, and what *can* be done. As can be seen in section III below, agreement on priority areas for horizontal research is a prerequisite to participation by interested departments, decisions on the allocation of cash and other resources, and the effective management of agreed projects.
- As a general rule, *priorities* are identified by the senior science and policy community for approval by concerned Ministers (often by Cabinet).
- *Issues*, however, are often identified from sources external to government (though senior science managers ought also to be thinking about which scientific issues merit investigation).

- In this regard, it was observed by one interviewee that the key functions of an ADM, Science are:
 - identifying problems to be worked on
 - bringing resources to bear on the problem
 - linking research results with policy

3. Deciding on Research Projects

- A transparent and merit-based process for decision making is essential to:
 - collaboration over time among concerned institutions
 - achieving buy-in from the science managers and scientists involved
 - assuring quality of work and outputs

4. Allocating Resources

- Lessons from experience are reviewed in section III below. Key points to bear in mind are:
 - departments cannot be expected to contribute resources, either human or financial, to projects that are not relevant to their responsibilities and agendas
 - resource contributions can be of several kinds – facilities, people or money
 - external partners (universities, private sector) will be able to make different sorts of contributions, and will have differing expectations of the results from the projects in which they participate. Those differences must be taken into account at the beginning, in the agreed management framework for the project

5. Managing Projects

- Effective management – in terms of continuing oversight, timely decision-making and appropriate staff support – is essential to the success of any collaborative enterprise, including horizontal science. Specific suggestions from experience and from the interviews are set out in sections III and IV below.

6. Assuring Clear Accountability

- This is essential not only to proper stewardship of resources, but just as importantly to ensuring the quality and credibility of the program.
- Without a transparent and rigorous accountability regime, horizontal projects become difficult to launch and manage, and very difficult to fund over time.

III. Lessons from Experience

1. This is not easy.

- As one interviewee put it, "horizontal science is like a marriage – you have to work at it". A sustained engagement across departmental lines requires the continuing personal commitment of the senior science people concerned – it's not something that can simply be started and left to run by itself.
- Another observation was that cooperation is easier bilaterally than multilaterally – easier to arrange, easier to manage and easier in terms of agreement on priority projects.

2. You can't ask departments to do something that is not in their interest.

- This is a key insight from experience. Especially at the beginning, it's important (even essential) to identify issues and research projects that several departments see as a top priority. Otherwise, even with the best will in the world from the scientists, rational management considerations will override the science and policy interest in a particular project.
- Moreover, it is difficult to obtain and maintain support for research that is not focused on "durable" problems – that is, issues of enduring concern to the department or agency involved.
- At the same time, we must recognize that a large part of government science (one person suggested 70%) is not "horizontal".
 - Much of what is done in and by the science departments and agencies will always be done for their specific purposes, and usually (though not necessarily) by their scientists.
 - Under this heading would fall the large volume of science activities that are carried out in direct support of program responsibilities such as regulation and enforcement (e.g., surveys).

3. Culture matters

- This was a point stressed by many interviewees. Government science is not by tradition horizontal¹, for a host of reasons well-known to the senior science community. Yet there is cause for hope: younger scientists are more oriented to team-based approach than older ones. And the observation was made that science managers are often more resistant to horizontal work than the research scientists themselves.
- In this regard, the signals sent from the top matter greatly. If the concerned ADM is seen to attach high priority to collaborative research, and to reward

¹ One major exception is in the international domain, where individual Canadian scientists collaborate regularly with counterparts in other countries.

those who do it well, then the message sinks in throughout the organization. If, on the other hand, the ADM says one thing and does another, that too is clearly understood by subordinate managers and research leaders.

4. *Incentives and rewards matter.*

- The practical barriers to effective horizontal work on major projects are considerable:
 - managers are reluctant to lose top researchers to projects over which they have no control, or which may not be central to their department's agenda
 - scientists are reluctant to head off on projects without knowing what will await them at the end
- All this means you have to:
 - reflect incentives and rewards clearly in the plan for the project, and in individual performance accords and assessments
 - recognize team achievements so that all the credit does not go to the project leaders
 - facilitate the return of project scientists to their home departments or units

5. *Accountability matters.*

- Effective leadership and appropriate levels of authority are seen as keys to the successful conduct of horizontal research projects. This means:
 - every project needs appropriate horizontal oversight
 - responsibility for leadership of horizontal project(s) must be in the performance agreement of the lead managers
- More generally, there is a need to reflect the importance of horizontal research in mandate letters and performance accords of concerned senior officials and science managers.
- There is also a need to recognize the risks involved in horizontal projects – it is harder to generate defined results without control over the research enterprise.

6. *Resources matter.*

- Several interviewees made comments to the effect that departments and agencies cannot continue to do horizontal science "off the corner of our desks".
- Moreover, some dedicated resources – obtained either from new money or from money reallocated from lesser priorities – are seen as essential to the

success of horizontal projects. And some of these resources should be held centrally, if only for the purpose of supporting the endeavour and the research network that is involved. As one person said, "unless there are jointly-held resources, you don't get much in the way of joint effort"

- It was suggested that one way to free up resources for horizontal purposes is to work on a project basis, as opposed providing A-base funding for a continuing domain of inquiry. (It was also observed, however, that some areas of responsibility lend themselves more to genuine project-based "R&D" than others where the science work ("related scientific activity") is more in support of a department's enforcement or regulatory responsibilities.

7. *Governance matters.*

- As noted, **project leadership** is important. While there is a need for a clear locus of responsibility and authority for each project, the collaborative nature of the projects in question suggests the desirability of:
 - co-leadership to ensure continuing support from key partners (as one interviewee put it, "sharing power is important")
 - a broader mechanism such as a management committee of participating departments and agencies is seen as essential to satisfying their interest in the project
- **A rigorous process of peer-review** is essential to the credibility of project approvals and resource allocation in support of them.
 - another lesson from experience – this is the easiest way to keep quality high, to keep a focus on the really important issues, and generally to add credibility to the process
- **Effective support to oversight and decision-making** is seen as essential to effective management. There are a variety of ways in which this can be done:
 - task a single central secretariat with this responsibility for a number of horizontal projects
 - provide dedicated staff support from the department of the chair or co-chairs of the management committee
- Also important are **clear, agreed rules for decision-making and resource allocation** inside government, and for the engagement of outside partners. Keys are
 - transparency in process and criteria for decision-making (this is seen as essential to trust)
 - as noted, clear accountability for the use of resources and achieving results

8. *Horizontality is not just an internal-to-government thing.*

- Several interviewees saw collaboration with universities, the private sector and international partners as also essential to effective science today.
- It was also observed that external partners can be useful in identifying issues and pushing for research into them. One interviewee commented that “external engagement and dialogue with stakeholders is a prerequisite for success”.
- *Stakeholders* (e.g., territorial governments, communities, or First Nations) are not the same as *research partners*. Both need to be involved appropriately in the governance of large, horizontal research projects.
 - stakeholders should be involved in priority-setting and overall direction, while partners should be involved in project-level management

IV. Options and Recommendations

There is a broad consensus among the senior science community that:

- a) horizontal S&T has become an increasingly important feature of the science and related policy landscape, and
- b) concerned departments and agencies must reach an understanding on how to do horizontal science as a normal part of doing business.

That is, the science departments and agencies need to agree on a general **governance framework** within which the players can situate particular initiatives and projects, and which can guide the creation of specific management structures for them.

This framework should include:

1. **Principles** to guide:
 - a. the creation of horizontal networks and specific research projects and teams
 - b. the roles of science personnel therein
2. **Mechanisms** for:
 - a. issue and project identification
 - b. decision-making on priorities
 - c. governance of the horizontal research enterprise as a whole
 - d. management of the specific research projects that fall within it
3. **Rules** to govern:
 - a. project assessment and selection

- b. participation by federal and external partners, including contractual arrangements
- c. cost-sharing for overheads and networks
- d. contributions of dollars, people and facilities

On this basis, the following approach suggests itself. Where relevant, options are noted.

Principles

1. Horizontal research and related scientific activities are a key dimension of the science mandate of every science department and agency.
2. Departments and agencies should regard their participation in horizontal science projects as a normal part of their business, and should reflect this in performance accords and associated regimes for performance assessment and reward.
3. Senior science managers have a responsibility to:
 - a. identify problems and issues within their department's mandate where a horizontal approach is appropriate
 - b. seek and allocate the necessary resources – human, financial and physical – to support the participation of their department or agency in such projects
 - c. play an appropriate role in the governance of such horizontal science projects and broader enterprises
 - d. ensure that participating research personnel play an appropriate role in the management of individual projects
 - e. involve external partners and stakeholders appropriately in such regimes of governance and management

Mechanisms

1. Each horizontal research *enterprise* should include:
 - a. participating departments and agencies (including, where appropriate, participation on an observer basis by interested central agencies)
 - b. external science partners (universities, other public research facilities such as hospitals, private sector research institutions or units, international partners)
 - c. stakeholders from outside the federal government
2. Each such horizontal research enterprise should be governed by a *board* consisting of representatives of the participating partners and stakeholders

- a. the board may be co-chaired by the lead department and another department, partner or stakeholder, or
 - b. the board may be led by a designated "lead department or agency"
3. Each horizontal *project* should be managed by a *project team* consisting of representatives of participating research organizations, chaired (ideally co-chaired) by representatives of the departments or agencies with the most significant interest in the project

Rules

1. Each horizontal research project should be *identified* for consideration on the basis of an agreed set of policy and research priorities
 - a. ideally these will be agreed by Ministers
 - b. if this is not possible, the priorities should:
 - i. reflect broader government and departmental/agency priorities as set out in such documents as the SFT or the Budget, and
 - ii. be agreed by Deputies
2. Successful projects should be selected on the basis of clear criteria of relevance and scientific merit, as determined by a selection committee consisting of members of the board and after a peer review of scientific merit.
3. No project shall be selected that is not defined by a clear statement of the relevant question(s) to be answered for policy or program purposes.
4. Each participating entity ('partner') will commit itself to contributing resources for the duration of the project
 - a. the nature of such contribution may vary depending on the size and nature of the project, and the capacities of the partner
 - b. federal departments and agencies will normally be expected to contribute at least some financial resources; it is expected that non-financial contributions (personnel, facilities) are more likely to be received from non-governmental partners
5. Obligations of non-governmental partners shall be set out clearly in contracts or contribution agreements.
6. Every entity making a financial contribution shall contribute in part to the supporting infrastructure for the management team for the project.
7. Every project shall have a fixed duration, which may be extended by the board.
8. Every project shall be subject to periodic evaluation and the results of such evaluations shall be made known:

- a. to the board
- b. to concerned deputies and heads of participating organizations

The foregoing are the elements of a governance framework for horizontal science. While some of these points may need to be fleshed out, and while there may be disagreement over precise mechanisms for governance or management, the basic proposition is clear: horizontal science is important and the federal departments and agencies must equip themselves to do it effectively and responsibly.

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