

Analysis Of Voting Patterns On S&T Issues: The National S&T Conference, Ottawa, October 1994

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### **Background**

In 1994 the Government of Canada undertook a major review of its S&T programs; and by implication, all S&T activities in Canada. This review had three separate streams, an internal review of federal S&T programs, ~ corresponding arm's-length review by the then National Advisory Board on Science and Technology, and a program of external consultations with all stakeholders in the national system of innovation. These external consultations consisted of almost 30 "town-hall" meetings in smaller communities across the country (generally communities where there was a significant S&T presence such as a university, followed up by a series of regional conferences, to help define national S&T issues. This series of conferences culminated in a national conference held in Ottawa, on October 12, 1994. Participants were asked to discuss a series of issues listed below, as the public input to the overall review of national S&T policy:

- Industrial Sector Competitiveness

- Strategic Opportunities within the Canadian Economy Technology Transfer
- Workforce Skills and Education
- Quality of Life
- Integration of Economic, Social and Environmental Goals Streamlining Federal Regulatory and Program Delivery Systems Human Implications of Technology
- Excellence in Science
- Aligning Science and Technology to Societal Needs Strengthening Canada's Science Culture
- National Systems of Innovation
- Infrastructure
- Measuring Return on S&T Investment
- Independent Advice

At the end of these discussions, participants were asked to vote on their reaction to the questions presented and on the priority that should be assigned to each of these topics in the overall S&T review. There were approximately 210 voting participants at the conference. These participants had been invited on basis of being S&T stakeholders with a demonstrated interest in S&T policy issues, so that the sample voting at the conference probably represented a good cross-section of informed opinion on Canadian S&T issues.

## The Survey Procedure

Participants were asked to vote, using an electronic voting system, on the propositions written out in full in Appendix " A " . They were asked two questions on each issue:

- 1) Do you support the issue as presented by the relevant working group (through its rapporteur)? Respondents were asked to:
  - support
  - accept with minor changes
  - accept with major changes
  - unacceptable
  - no opinion.
- 2) What priority (high, medium or low) would you set on this issue for action by the government?

The data for question 1) were tabulated on a four-point scale, with four equaling "support", ranging to one equaling "unacceptable". "No opinion" responses were not included (i.e. scored as zero). The data for question 2) were tabulated on a three point scale with "high" equaling three, and "low" equaling one. Means and standard deviations were calculated to determine which issues had statistically higher than average responses. There was an average of 182 respondents to the reaction questions and 156 for the priority questions.

As part of the voting process, the sectoral, regional and user/producer of technology distributions were determined. The sectoral distribution was:

- Business 32%
- Education 33%
- Government (primarily federal) 16%
- Others (students, First Nations, etc.) 19%

Regional distribution was as follows:

- British Columbia 10%
- Prairies 18%
- Ontario 43%
- Quebec 15%
- Atlantic 11%
- Yukon/NWT 2%

Participants were asked whether they thought they were producers of technology or users of technology. Based on those who answered and voted:

- Producers 50%
- Users 30%
- Not sure 20%

## Results and Analysis

The summary data are shown in Table I. The table shows the fifteen issues presented to the conference, and indicates which issues had higher than average approval ratings, and higher than average priority ratings. Some issues had support ratings that were more than one standard deviation higher than the average, indicating particularly strong support for that issue or priority.

The responses to questions on institutional and regional affiliations were used to cross-tabulate the responses to the reaction and priority questions. The results of these cross-tabulations are recorded in Tables 2,3 and 4. Cross-tabulated results are not shown for the Maritimes, B.C., or Yukon/NWT due to the relatively small number of respondents to some or all questions.

The respondents, all participants at the conference, could best be described as well-informed, highly motivated, S&T program stakeholders. They had been invited to the conference on the basis of their demonstrated interest in S&T issues, and they had paid their own expenses to come to the conference. As might be expected, given that the participants all were stakeholders interested in S&T policy issues, the results tended to fall between "support" and "accept with minor changes" and "high" priority and "medium" priority. Consequently the data were interpreted such that statistically significant agreement could be inferred when the mean score for a particular question was more than one standard deviation above "accept with minor changes" or "medium priority". Each question was treated as a separate test; the scoring results (and their means) were not compared from question to question.

### **Summary Results:**

- ❖ Delegates gave strong support to the infrastructure and measuring return on S&T investment (ROI) propositions.
- ❖ However they felt that industrial sector competitiveness and workplace skills were the areas that should have the highest priority.

### **Sectoral Results:**

- ❖ Industry delegates supported the infrastructure proposition and gave competitiveness the highest priority.
- ❖ Education sector delegates gave both excellence in science and infrastructure the highest support, but gave no strong support for any priority.
- ❖ Government sector participants supported both infrastructure and measurement of ROI, and accorded technology transfer, excellence in science and infrastructure the highest priorities.

### **Regional Results.**

- ❖ As noted the Maritimes, B.C. and the Yukon/NWT had too few respondents to give meaningful results.
- ❖ Prairie delegates supported the ROI proposition, but accorded no strong priorities.
- ❖ Ontario participants supported the infrastructure proposition, and accorded high priorities to industrial competitiveness and workplace skills.
- ❖ Quebec delegates had the distinction of expressing their preferences most strongly. They gave strong support to the excellence in science, infrastructure, and measuring ROI. They felt that industrial competitiveness, technology transfer, excellence in science and infrastructure all rated higher priorities.

### **User/Producer Results**

- ❖ The data were more diffuse, possibly because participants had difficulty with the concepts of user and producer (as evidenced by the large "don't know" response).
- ❖ Users gave infrastructure strong support and workplace skills a higher priority.
- ❖ Producers gave infrastructure and measuring ROI strong support and industrial competitiveness and workplace skills higher priorities.

## **Conclusions**

In studying S&T policy, it is useful to be able to winnow the entire spectrum of issues to concentrate on the few that represent a strong consensus of S&T stakeholders. While the results of a survey of stakeholders must be interpreted with care, those responses that have significantly higher than average responses do indicate a strong feeling on the issues. Given the process for selecting delegates to the conference, the conclusions may have been predictable, but they confirm in a quantitative manner, qualitative observations that were made during the consultation process. Those who participated do represent the best-informed and most highly motivated stakeholders. Thus, the issues that did receive strong support should be addressed in the formulation and implementation of a national S&T policy.

## **Acknowledgments**

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**Table 1**

**SUMMARY OF VOTING RESPONSES BY ISSUE**

<b>Issue</b>	<b>Reaction (Support)</b>	<b>Priority (High)</b>
Industrial Sector Competitiveness	X	Y*
Strat. Opportunities in the Economy		Y
Technology Transfer	X	Y
Workplace Skills and Education		Y*
Quality of Life	X	Y
Integration of Soc., Eco., & Environ. Goals	X	
Streamlining Fed. Regs. & Program Del.	X	Y
Human Implications of Technology		
Excellence in Science	X	Y
Aligning S&T to Social Needs		
Strengthening Canada's Science Culture		Y
National System of Innovation	X	Y
Infrastructure	X*	Y
Measuring Return on Investment	X*	Y
Independent Advice		

X Mean falls between "Support Completely" and "Support With Minor Changes"

Y Mean falls between "High" and "Medium" priority

\* Mean value is one standard deviation higher than "support with minor changes", or "medium priority".

**Table 2**

**SUMMARY OF VOTING RESPONSES BY ISSUE**

Issue	Industry		Education		Government	
	Reaction	Priority	Reaction	Priority	Reaction	Priority
Industrial Sector Competitiveness	X	Y*		Y	X	Y*
Strat. Opportunities in the Economy	X	Y		Y	X	Y
Technology Transfer	X	Y	X	Y	X	Y*
Workplace Skills and Education	X	Y		Y		Y
Quality of Life			X	Y		Y
Integration of Soc., Eco., & Environ. Goals	X		X	Y		Y
Streamlining Fed. Regs. & Program Del.	X	Y				Y
Human Implications of Technology				Y		
Excellence in Science	X	Y	X	Y	X	Y*
Aligning S&T to Social Needs				Y	X	
Strengthening Canada's Science Culture		Y		Y	X	Y
National System of Innovation	X	Y		Y	X	Y
Infrastructure	X	Y	X*	Y	X*	Y*
Measuring Return on Investment	X*	Y	X		X*	Y
Independent Advice					X	

X = Mean falls between "Support Completely" and "Support With Minor Changes"

Y = Mean falls between "High" and "Medium" priority

\* = Mean value is one standard deviation higher than "support with minor changes", or "medium priority".

**Table 3**

**SUMMARY OF VOTING RESPONSES BY ISSUE**

Issue	Prairies		Ontario		Quebec	
	Reaction	Priority	Reaction	Priority	Reaction	Priority
Industrial Sector Competitiveness	X	Y	X	Y*	X	Y*
Strat. Opportunities in the Economy		Y		Y	X	Y
Technology Transfer		Y		Y	X	Y*
Workplace Skills and Education		Y		Y*		Y*
Quality of Life	X	Y			X	Y
Integration of Soc., Eco., & Environ. Goals	X		X		X	
Streamlining Fed. Regs. & Program Del.	X	Y	X	Y	X	Y
Human Implications of Technology						
Excellence in Science	X	Y	X	Y	X*	Y*
Aligning S&T to Social Needs						
Strengthening Canada's Science Culture		Y		Y		Y
National System of Innovation	X	Y		Y	X	Y
Infrastructure	X*	Y	X*	Y	X*	Y*
Measuring Return on Investment	X	Y	X	Y	X*	Y
Independent Advice					X	

X = Mean falls between "Support Completely" and "Support With Minor Changes"

Y = Mean falls between "High" and "Medium" priority

\* = Mean value is one standard deviation higher than "support with minor changes", or "medium priority".



**Table 4**

**SUMMARY OF VOTING RESPONSES BY ISSUE**

Issue	Users		Producers	
	Reaction	Priority	Reaction	Priority
Industrial Sector Competitiveness	X	Y	X	Y*
Strat. Opportunities in the Economy		Y	X	Y
Technology Transfer	X	Y	X	Y
Workplace Skills and Education	X	Y*		Y*
Quality of Life		Y	X	
Integration of Soc., Eco., & Environ. Goals	X	Y	X	
Streamlining Fed. Regs. & Program Del.	X		X	Y
Human Implications of Technology				
Excellence in Science	X	Y	X	Y
Aligning S&T to Social Needs		Y		
Strengthening Canada's Science Culture	X	Y		Y
National System of Innovation	X	Y	X	Y
Infrastructure	X*	Y	X*	Y
Measuring Return on Investment	X	Y	X*	Y
Independent Advice				

X Mean falls between "Support Completely" and "Support With Minor Changes"

Y Mean falls between "High" and "Medium" priority

\* Mean value is one standard deviation higher than "support with minor changes", or "medium priority".

## List Of Questions

Participants were asked the degree to which they agreed with, and the priority they would assign for implementation, to the following proposals:

Do you agree, support with minor changes, support with major changes, or disagree that:

1. Competitive firms need the ability and the environment to develop, adopt and adapt best practices and technologies to create sustainable wealth.
2. Canadians will (need to) identify and invest in creating areas of strategic opportunity critical for creating sustainable wealth and jobs into the next century.
3. Canada needs to create an environment where entrepreneurial innovators are valued and value technology transfer; effective mechanisms are needed to accelerate the transfer of knowledge onto wealth creating and sustainable economic activity; the rate and effectiveness of the transfer of appropriate technology to small and medium-sized businesses needs to be accelerated; more firms with a strong receptor capability for existing and new technology, whether developed in-house or acquired from others need to be developed.
4. Canada requires a workforce to create and support a knowledge-based economy to renew and enhance its competencies continually.
5. Starting now, Canada needs to identify, pursue and apply areas of research that are of strategic importance to the quality of life to all Canadians.
6. In setting S&T priorities, emphasis must be placed on integrating economic, social and environmental goals.
7. (We need to) Streamline and improve Canada's regulatory system to make Canada a favoured launching pad for the development of new high quality products and services; Safeguard and enhance the health, safety and well-being of Canadians through the application of S&T; streamline, rationalize and focus federal programs to ensure their responsiveness to client needs, and their relevance to economic reality.
8. Research in the human and social sciences is integral to the development, implementation, monitoring and understanding of new (and old) technologies on Canadians and First Nations peoples, and for enhancing the well-being of all Canadians and First Nations peoples, research in the human and social sciences involves the interests of all, including those groups which are often under-represented in decision-making processes.
9. Canadians need to benefit from the best knowledge available in Canada and abroad; Canada must have a program of research and training that is comparable in quality with our principle economic competitors.
10. We need ways and means to ensure that Canada's societal needs are better reflected in the decision-making processes for the allocation of S&T resources.

11. (We need to) Improve the level of appreciation, understanding and participation of Canadians in the mathematical, natural, social and engineering sciences; increase the representation of under-represented and disadvantaged groups, particularly women and native peoples in these disciplines.
12. (We need to) Strengthen Canada's national system of innovation to apply world knowledge to enable Canada to produce and market innovative products and services.
13. Canada's capacity for wealth creation depends critically on the strength of our public and private infrastructure; excellence and effectiveness in innovation requires internationally competitive infrastructure; Canada's infrastructure should include access to data and information in all areas of the country.
14. The federal government must be able to measure and report on the return on S&T investment.
15. Canada needs a systematic means of marshaling and delivering timely, focused and reliable S&T advice to government.