

NSERC Management Response: Evaluation of NSERC's Discovery Program

Discovery Grants are NSERC's leading source of funding for thousands of researchers each year. These grants account for more than one-third of NSERC's total annual budget of \$1.1 billion and are our single largest area of investment.

Learn more about how scientists and engineers in your region are keeping Canada at the forefront of discovery and innovation: www.nserc-crsng.gc.ca/discovery

CONTEXT

Since NSERC's inception, Discovery Grants¹ have been one of Canada's main sources of support for broad-based research across disciplines in the natural sciences and engineering. The program promotes and supports a diversified base of high-quality research capacity at university campuses across Canada. It is NSERC's flagship program and continues to maintain its international reputation for excellence.

Discovery Grants, last evaluated in 2008, push the boundaries of knowledge across all fields and are a catalyst for research collaboration. In 2009 NSERC introduced a two-step review process, separating the merit evaluation from the funding recommendation, followed by the introduction of a Conference Model in 2010 for the review of applications. The implementation of these changes to the peer review system has proven to be a more flexible and dynamic approach, allowing NSERC to adapt quickly to changes in the research environment and to better accommodate proposals that cross disciplines.

Five years later, another review² of the Discovery program³ was completed. Although the evaluation is intended to cover the broader Discovery program, this evaluation has been scoped such that its primary focus is Discovery Grants. There were two main drivers for the review, completed in spring 2014. First, the review of relevance, design and delivery, effectiveness and efficiency of the Discovery program, as part of NSERC's regular program evaluation cycle, whereby grant programs are evaluated every five years to review their relevance and effectiveness at meeting their objectives according to guidelines prepared by the Treasury Board Secretariat. Second, and of prime importance for NSERC, was the evaluation of the impact of the changes made to Discovery Grants five years ago resulting from the previous review. The main objective of these changes was to make the evaluation processes more fair and transparent for all applicants, and to allow the most worthy candidates to secure funding that would permit them to mount or maintain internationally competitive careers.

This review covers the five-year period following the last evaluation, from fiscal year 2008-2009 to the end of fiscal year 2012-2013.

¹ The name was changed in 1992 from the 'Operating Grants' to the 'Research Grants', and again in 2003 to the 'Discovery Grants'

² In accordance with Treasury Board's [Policy on Evaluation](#) and the requirements of Section 42.1 of the [Financial Administration Act](#).

³ As per NSERC's program alignment architecture, the Discovery program consists of two sub-programs: 1) Discovery Research (of which Discovery Grants is the primary funding opportunity) and 2) Research Equipment and Infrastructure.

OVERVIEW – MANAGEMENT RESPONSE

Management is pleased with the overarching conclusion of the International Review Panel that Discovery Grants are high performing, relevant, efficient, and that the revised peer review process should be maintained with some refinements. NSERC welcomes the advice to stay the course with no major changes recommended.

The Panel concluded that Discovery Grants continue to be Canada's most crucial support mechanism for broad-based research in the natural sciences and engineering, and should be fully recognized for its role. NSERC also acknowledges the Panel's recognition for supporting the next generation of scientists who will help ensure Canada's prosperity in the future.

The importance of funding for fundamental, discovery research is underlined in a recent Council of Canadian Academies (CCA) report entitled [Paradox Lost: Explaining Canada's Research Strength and Innovation Weakness](#). The CCA's [presentation](#) on the report notes that innovation policy should sustain Canada's research strengths, which act as the foundation for business innovation. In addition, it notes that academic research excellence matters because "it is essential to train the next generation at the leading edge, is also the 'price of admission' to the latest global pool of knowledge and networks, it enhances Canada's attractiveness for high value foreign direct investment by knowledge-intensive businesses, and sometimes it leads directly to commercial spin-offs."

Management appreciates and recognizes the thorough work invested in this review by members of the International Review Panel, whose efforts, on a voluntary basis, produced a sound and in-depth analysis of Discovery Grants. The review confirms the international stature, the relevance and the quality of the program.

NSERC would also like to thank the research community for providing invaluable feedback throughout the course of the evaluation. Thousands of Discovery Grant holders, applicants, highly qualified personnel, Evaluation Group members and chairs participated in on-line surveys. Input was also obtained from scientific societies and university administrators across the country.

RECOMMENDATIONS

Recommendation #1: Refine the Discovery Accelerator Supplements.

The intent and nature of the Discovery Accelerator Supplements should be refined. The Panel recommended:

- maintaining the Discovery Accelerator Supplements envelope as a separate allocation from Discovery Grants;
- altering the focus of Discovery Accelerator Supplements away from support for “high-risk” applications, and more towards its original “accelerator” intent, but in a more targeted fashion;
- targeting Discovery Accelerator Supplements funding towards early-stage researchers (e.g., up to 10 years after PhD) and first renewals, to accelerate support for those showing evidence of early successes in order to allow a firm start to a new career; and
- communicating this shift in focus clearly to the community (as the current “new” goals are still not well understood).

Management Response: *Agreed in principle*

Management notes the Panel’s conclusion that the Discovery Accelerator Supplements should be reconsidered because of difficulties associated with defining and assessing high-risk research, as well as the suggestion to target the DAS toward early-stage researchers. The objective of identifying rising stars early on, as well as supporting excellence at a critical career stage, aligns with NSERC’s priorities and the Government of Canada’s [Science and Technology Strategy](#). Doing so will enable Canada to attract and retain top research talent.

Proposed Actions

Responsibility: Research Grants and Scholarships, in collaboration with External Relations and Communications / Timeline: 2016

- Management will examine the current objectives of the Discovery Accelerator Supplements.
- Working with the Committee on Grants and Scholarships, management will consider targeting Discovery Accelerator Supplements funding toward early-stage researchers who show evidence of early successes, and will assess other potential priorities for the program. NSERC will clearly communicate any program changes to the community.

Recommendation #2: Allow early first renewal for early-stage researchers.

The Panel recommended:

- increasing flexibility to allow early-stage researchers to apply early for a first renewal, at their discretion.
 - The funding recommendation of the Evaluation Group would be final, whether they were “normal” renewals after five years, or an early first renewal after three or four years.
 - Outcomes of first renewal applications would be monitored and reported separately from subsequent renewal applicants.
 - The Discovery Accelerator Supplements could be considered as a source of additional funding, following adjustments of its goals (see recommendation #1).

Management Response: *Agreed in principle*

NSERC is committed to supporting early-career researchers whose training and expertise have yielded valuable contributions in the natural sciences and engineering fields, and acknowledges the Panel's interest in their funding outcomes.

NSERC currently monitors outcomes for first renewal applications. However, the results have not been reported separately from other renewal applications. Management notes the Panel's suggestion to consider outcomes for early-stage researchers who are generally up to ten years beyond their PhD. The feasibility of allowing such early first renewals needs to be examined and the impact on workloads of volunteer Evaluation Group members and staff would need to be quantified and monitored. It is also worth noting that NSERC's policies are not based on timing of tenure processes at universities.

It may be appropriate to allocate funds from the Discovery Accelerator Supplements to compensate for funding pressures from early first renewal applicants. This approach is subject to further consideration and to the outcome of refining the nature and intent of the Discovery Accelerator Supplements.

Proposed Actions

Responsibility: Research Grants and Scholarships / Timeline: 2016

- Management will explore the option of allowing early first renewal applications.
- In consultation with the Committee on Grants and Scholarships, NSERC will evaluate the suggestion that additional funding could potentially come from a revised Discovery Accelerator Supplements. This approach is subject to analysis of the requirement for additional funding to support early first renewals, and the nature and intent of the Discovery Accelerator Supplements in the future (see Recommendation #1).

Responsibility: Research Grants and Scholarships / Timeline: 2014 and ongoing

- Management will revise Discovery Grants competition statistics to disaggregate outcomes of first renewal applications for better reporting.

Recommendation #3: Make small refinements to the peer review process.

The Panel recommended:

- better communicating how the conference model works with regard to how the review of interdisciplinary applications is conducted; and
- considering ways to provide more and better feedback to Discovery Grant applicants, especially those who received lower (or null) awards.

Management Response: *Agreed*

Management recognizes the value of increased, specific feedback to applicants. In light of high application volumes each year, NSERC must consider the increased demand on volunteer Evaluation Group members and staff.

Proposed Actions

Responsibility: Research Grants and Scholarships, in collaboration with External Relations and Communications / Timeline: 2014

- NSERC will explore ways to better communicate how the Conference Model works with regard to the review of interdisciplinary applications. Staff will have the opportunity to present this information, including promoting NSERC's online videos, at scientific society visits in the spring/summer of 2014 and through articles in NSERC's newsletter.

Responsibility: Research Grants and Scholarships / Timeline: 2016

- Management will assess options for capturing and sharing increased feedback with applicants while minimizing the impact on volunteer Evaluation Group members (see Recommendation #6) and staff.

Recommendation #4: Retain use of the research cost factor and application budget information.

The Panel recommended:

- retaining the cost of research adjustment tool, which is used to alter grant amounts modestly within funding Bins, for those Evaluation Groups that wish to use it to adjust for differential costs; and
- continuing to require budget justification in applications.

Management Response: Agreed

No action is required by NSERC.

Recommendation #5: Consider revising the HQP criterion.

The Panel recommended:

- maintaining the three criteria currently used to review Discovery Grant applications, but considering revising the criterion for contributions to training of HQP;
- reviewing international programs for best practices with respect to assessing HQP training in order to identify opportunities to improve the definition of this criterion; for example, considering whether the HQP criterion should focus only on students and PDFs (i.e., not research associates or technicians);
- consulting the Committee on Grants and Scholarships, as well as the Evaluation Groups, on how to improve the assessment of the HQP criterion and on communicating to the community;
- if a better HQP metric cannot be developed, consider revising the current weighting of the three Discovery Grants assessment criteria from 33% each to 40% (excellence of the researcher), 40% (merit of the proposal), and 20% (training of HQP). This was the weighting most commonly suggested by the community, and which would not significantly change Bin distribution; and
- if the weighting is changed, communicating that training has not been de-emphasized in any way, but continues to be a core goal of NSERC and Discovery Grants.

Management Response: Agreed in principle

Management recognizes the importance of all three Discovery Grants selection criteria. NSERC strongly agrees that HQP training and a strong research training environment remain key objectives for, and outcomes of, Discovery Grants and are closely linked to its relevance.

As noted by the Panel, HQP training can be universally a difficult criterion to evaluate in similar programs internationally, given inherent difficulties in securing concrete information or metrics. Whether the HQP

training criterion is too heavily weighted in the current review process of Discovery Grants requires further examination. A key consideration for management is whether the best means to address this difficulty is to slightly reduce the weighting of the HQP training criterion), or to improve its definition and the tools, information in applications and guidance to Evaluation Group members for its assessment.

Management considers that the difficulties in reviewing the HQP training criterion relate to all categories of applicants but may be more pronounced in certain categories, and to assessing the quality of the training environment and its impact. Revisions to the HQP training criterion and, in particular, its application to early career researchers, will be analyzed in the light of other Panel recommendations relating to support for this group. Management also notes the Panel's proposal that a lower weight for HQP training may be appropriate as an adjudication refinement rather than a priority shift.

Proposed Actions

Responsibility: Research Grants and Scholarships / Timeline: 2016

- Management will investigate best practices and consider potential improvements in the assessment of the HQP training criterion. This includes the definition of the HQP training criterion and how it is interpreted across different categories of applicants.
- Management, in consultation with the Committee on Grants and Scholarships, will explore ways for potential improvements of the assessment of the HQP criterion and communicate any changes to the community.
- Following the work on improving the assessment of the HQP training criterion, management, in consultation with the Committee on Grants and Scholarships, will consider whether there is a need to revise the current weighting of the three criteria, as well as consider the impacts of revising the current weighting with respect to the structure and distribution of the binning system.

Recommendation #6: Investigate additional efficiencies in the review process.

Some Panel members believed that it may be possible to reduce the high EG workload. The panel recommended:

- consulting with the Committee on Grants and Scholarships to review the models of other agencies and countries to identify opportunities for increased efficiencies.

Management Response: *Agreed*

NSERC recognizes and appreciates the considerable time required of Evaluation Group members who participate in the Discovery Grants peer review process. In fact, this commitment is arguably the program's strongest feature, having received international praise.

Management has a long history of working to strike a balance between the workload of Evaluation Group members, the resources dedicated to deliver the peer review process and the quality of the process.

Proposed Actions

Responsibility: Research Grants and Scholarships / Timeline: Ongoing

- In consultation with the Committee on Grants and Scholarships, management will strive to make the peer review process as efficient as possible. Efficiencies could be realized through technological advances or changes in the review process.

NSERC Management Response – Summary Table

| Recommendations | Agree / Disagree | Proposed Actions | Responsibility | Timeline |
|---|---|---|---|-------------|
| <p>1. Refine the Discovery Accelerator Supplements. The intent and nature of the Discovery Accelerator Supplements should be refined. The Panel recommended:</p> <ul style="list-style-type: none"> • maintaining the Discovery Accelerator Supplements envelope as a separate allocation from Discovery Grants; • altering the focus of Discovery Accelerator Supplements away from support for “high-risk” applications, and more towards its original “accelerator” intent, but in a more targeted fashion; • targeting Discovery Accelerator Supplements funding towards early-stage researchers (e.g., up to 10 years after PhD) and first renewals, to accelerate support for those showing evidence of early successes in order to allow a firm start to a new career; and • communicating this shift in focus clearly to the community (as the current “new” goals are still not well understood). | <p>Agree</p> <p>Agree in principle</p> <p>Agree in principle</p> <p>Agree</p> | <p>No action required.</p> <p>Research Grants and Scholarships (RGS) Management will examine the current objectives of the Discovery Accelerator Supplements.</p> <p>Working with the Committee on Grants and Scholarships (COGS), RGS Management will consider targeting Discovery Accelerator Supplements funding toward early-stage researchers who show evidence of early successes and will assess other potential priorities for the program.</p> <p>NSERC will clearly communicate any changes to the community.</p> | <p>RGS Management</p> <p>RGS Management</p> <p>RGS Management with support from External Relations & Communications</p> | <p>2016</p> |

NSERC Management Response – Summary Table

| Recommendations | Agree / Disagree | Proposed Actions | Responsibility | Timeline |
|---|---|--|---|---|
| <p>2. Allow early first renewal for early-stage researchers. The Panel recommended:</p> <ul style="list-style-type: none"> • increasing flexibility to allow early-stage researchers to apply early for a first renewal, at their discretion. <ul style="list-style-type: none"> ▪ The funding recommendation of the Evaluation Group would be final, whether they were “normal” renewals after five years, or an early first renewal after three or four years. ▪ Outcomes of first renewal applications would be monitored and reported separately from subsequent renewal applicants. ▪ The Discovery Accelerator Supplements could be considered as a source of additional funding, following adjustments of its goals (see recommendation #1). | <p>Agree in principle</p> <p>Agree</p> <p>Agree</p> <p>Requires further study</p> | <p>RGS Management will explore the option to allow early first renewal applications.</p> <p>No action required.</p> <p>RGS Management will revise Discovery Grants competition statistics to disaggregate outcomes of first renewal applications for better reporting.</p> <p>In consultation with COGS, RGS Management will further analyze:</p> <ul style="list-style-type: none"> i. the requirement for additional funding to support early first renewals; and ii. the nature and intent of the Discovery Accelerator Supplements (see Recommendation 1). | <p>RGS Management</p> <p>RGS Management</p> <p>RGS Management</p> | <p>2016</p> <p>2014 and ongoing</p> <p>2016</p> |

NSERC Management Response – Summary Table

| Recommendations | Agree / Disagree | Proposed Actions | Responsibility | Timeline |
|--|--|--|--|-------------|
| <p>5. Consider revising the HQP criterion. The Panel recommended:</p> <ul style="list-style-type: none"> maintaining the three criteria currently used to review Discovery Grant applications, but considering revising the criterion for contributions to training of HQP; reviewing international programs for best practices with respect to assessing HQP training in order to identify opportunities to improve the definition of this criterion; for example, considering whether the HQP criterion should focus only on students and PDFs (i.e., not research associates or technicians); consulting the Committee on Grants and Scholarships, as well as the Evaluation Groups, on how to improve the assessment of the HQP criterion and on communicating to the community; if a better HQP metric cannot be developed, consider revising the current weighting of the three Discovery Grants assessment criteria from 33% each to 40% (excellence of the researcher), 40% (merit of the proposal), and 20% (training of HQP). This was the weighting most commonly suggested by the community, and which would not significantly change Bin distribution; and if the weighting is changed, communicating that training has not been de-emphasized in any way, but continues to be a core goal of NSERC and Discovery Grants. | <p>Agree</p> <p>Agree in principle</p> <p>Agree</p> <p>Requires further study</p> <p>Agree</p> | <p>No action required.</p> <p>RGS Management will investigate best practices and consider potential improvements. This includes the definition of the HQP training criterion and how it is interpreted across different categories of applicants.</p> <p>RGS Management, in consultation with COGS, will explore ways for potential improvements of the assessment of the HQP training criterion and communicate any changes to the community.</p> <p>Following the work on improving the assessment of the HQP training criterion, RGS Management, in consultation with COGS, will consider whether there is a need to revise the current weighting of the three criteria, as well as its impact on the structure and distribution of the binning system.</p> <p>RGS Management will communicate any changes.</p> | <p>RGS Management</p> <p>RGS Management</p> <p>RGS Management</p> <p>RGS Management with support from External Relations & Communications</p> | <p>2016</p> |

NSERC Management Response – Summary Table

| Recommendations | Agree / Disagree | Proposed Actions | Responsibility | Timeline |
|---|------------------|--|----------------|----------|
| <p>6. Investigate additional efficiencies in the review process. Some Panel members believed that it may be possible to reduce the high EG workload. The Panel recommended:</p> <ul style="list-style-type: none"> consulting with the Committee on Grants and Scholarships to review the models of other agencies and countries to identify opportunities for increased efficiencies | Agree | RGS Management, in consultation with COGS, will strive to make the peer review process as efficient as possible. Efficiencies could be realized through technological advances or changes in the review process. | RGS Management | Ongoing |