



Summary of interviews conducted with Discovery Grants Selection Committee Members

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1. Introduction

NSERC commissioned an international review panel and consulted the relevant Canadian stakeholders to determine whether its current awards to applicants funding ratio of 75% in discovery research is consistent with international standards of excellence and whether this funding approach is appropriate.

Typically, each Grant Selection Committee (GSC), in order to perform its task efficiently and equitably, includes research managers, experienced practitioners (those with hands-on experience) and researchers from academia, industry and government laboratories from Canadian and foreign institutions. In order to compare and contrast our program with others, comments were sought from particular GSC members. These individuals offered a unique perspective as they were familiar with the Canadian system yet lacked the opportunity to directly benefit from NSERC programs due to their principal appointments at foreign institutions and within Canadian government and industry.

2. Methodology

2.1 Interview with Foreign GSC members

A semi-questionnaire was sent in advance to foreign GSC members and was followed by a phone interview. This instrument was used to collect information on the Discovery Grants Program. The questionnaire was developed by NSERC staff. A pre-test involving former GSC members was conducted and provided suggestions to increase the clarity and logical ordering of the questions.

The questionnaire (Appendix 1) contained three sections relating to : program objectives; international competitiveness and adequacy of funding; and rigour of peer review. The interviews took place between July 3rd and August 28th, 2007 and lasted on average 45 minutes.

2.1.1 Sampling

The target population for the interviews consisted of 44 current or former GSC members from outside Canada whose terms began in June 2005 or later. A sample of 34 members were invited by e-mail. A total of 30 interviews (n=30) were completed, resulting in a 88% response rate.

2.1.2 Interview Respondent Characteristics

Respondents had participated recently as members of a GSC for one to three years. Familiarity with the Canadian research system and NSERC's Discovery Grant program varied from one member to another. In general, members were fairly knowledgeable of the Canadian system.

The vast majority of foreign members were from the United States. A detailed breakdown of the number of interviews by division is presented in table 1 and the origin of the members is presented in table 2.

Table 1 : Breakdown of the number of interviews by divisions

Division	# of interviews
Chemistry	5
Mathematical Sciences	8
Engineering	4
Life Sciences	5
Physics and Environment	8
Total	30

Table 2 : Country of origin of the Foreign GSC members.

Country	# of members
USA	26
France	1
Switzerland	2
United Kingdom	1

2.2 *Interview with Canadian industrial and government members*

A similar questionnaire used for the foreign members was sent in advance to Canadian industrial and governmental GSC members and was followed by a phone interview. For question 8, the sub-question related to the proportion of researchers supported by NSERC compared to their own system was eliminated.

Interviews took place between September 13th and October 1st, 2007 and lasted, on average, 45 minutes.

2.2.1 Sampling

The target population for the interviews was composed of 54 current or former GSC members from Canadian industries or governmental institutions whose terms began in June 2005 or later. A sample of 18 of these members were invited by e-mail. A total of 12 interviews (n=12) were completed, providing a 67% response rate.

2.2.2 Interview Respondent Characteristics

Seven respondents were from industry and five from government agencies. Respondents participated as members of a Grant Selection Committee for one to three years. Familiarity with the Canadian research system and NSERC's Discovery Grants program varied from one member to another. In general, members were fairly knowledgeable of the Canadian system.

3. Findings

3.1 *Program objectives*

The Discovery Grants Program has three objectives; 1) promote and maintain a diversified base of high quality research capability, 2) foster research excellence and 3) provide a stimulating environment for research training. When asked whether these objectives should be considered equally important, or whether greater importance be attached to one over another (and if so which one), foreign respondents had mixed views. About half said that the three objectives were equally important and about half said these were not equally important. In contrast, the vast majority of the Canadian respondents from the private and government sectors believed that the Discovery Grants program objectives were equally important (10/12). One respondent was unable to comment as this person felt that it was really of matter of political priorities within Canada.

Of those who indicated that the objectives were equally important, it was felt that the three objectives are interlinked and complementary - the three objectives were viewed as being necessary, overlapping and self reinforcing. One respondent pointed out that one objective cannot be removed without affecting the other. It was believed that the current approach serves Canada well as it creates a stimulating research environment (2/30). One respondent noted that these objectives are similar to the objective of other programs in Europe; which could be construed as a sort of an international consensus on their importance.

Even though respondents were not specifically asked to prioritize the three objectives about half of all respondents did so, and indicated that fostering research excellence would be the most important objective, followed by providing a stimulating environment for research training of highly qualified personnel and finally maintaining a diversified base of high quality research. Aspects of the importance of each objective, as highlighted by respondents, are presented below.

a) Foster research excellence

Fostering research excellence is considered to be the most important objective. This is not surprising as ensuring excellence is inherent in the rationale for undertaking peer review. It was felt that other objectives should be addressed after excellence has been established.

b) Stimulating environment for training

A few respondents indicated that providing a stimulating environment for research training is also an important objective and for most, it goes hand in hand with fostering excellence. The Discovery Grants program emphasizes the training of highly qualified personnel aspect to a greater extent than a number of foreign funding agencies. This was believed to be an asset to Canada as it supports the training of the next generation of scientists and adds value to the Canadian workforce. The Discovery Grants program allows for undergraduate students to become interested in research careers and stimulates the research interest in more remote areas by spreading the burden of training across Canada. One respondent from the public sector made the comment that the Discovery Grants program overcomes the lack of student support through scholarship in more geographically remote areas.¹

c) Diversified base of research capacity

Some respondents struggled with the definition of diversity as it can be interpreted in many ways (e.g. young/senior investigators, geographical, discipline base, type of research, research topics) (5/30).

Respondents had mixed views about the value of maintaining a diversified based of high quality research capability. On one hand, maintaining a diversified base ensures that research areas that might not be hot at one point, but might become relevant in 10 or 20 years (e.g., solar energy in the '80s), are supported. Diversity was viewed as one of the qualities of the Discovery Grants Program, as it allows for intellectual diversity on a specific research topic (i.e., not putting one's eggs all in the same basket). One respondent pointed out that in the current context of concentration of research topics/approach, maintaining a diversified based of high quality research capability is essential; *"Diversity in research is as important as biodiversity"*.

On the other hand, concerns associated with this objective are that there might be too much emphasis on a diversified base of research capacity; placing too great a focus on a diversified base could be equated to *"throwing seeds in the wind"*. One industrial GSC member felt that the Discovery Grants program should fund research that has an impact and concentrate in areas

¹ At the undergraduate level, the number of scholarship applications an institution can submit is set by NSERC and is proportional to the institution's success at receiving NSERC funding. For graduate students, the quota is proportional to past success rate in the scholarship programs.

relevant to the Canadians and the industry sector (e.g., flat panels, where Koreans are way ahead of the game).

3.1.1 Balance between excellence and diversity

When asked to what extent NSERC is currently striking the right balance between supporting a diversified base of high-quality research and fostering excellence, most respondents indicated that NSERC is striking the right balance, but about a third thought that NSERC is not.

Of the people that indicated that NSERC was not striking the right balance (11/42), more than half of the respondents felt that the balance was skewed toward diversity and should be readjusted toward fostering excellence. The rationale for this was that too much diversification can lead to a dilution of research capability and/or a reduction in quality.

3.2 *Program-based compared to project-based research*

Discovery Grants support ongoing programs of research (with long-term goals) rather than a single short-term project or collection of projects. Researchers select their own lines of inquiry and are free to modify their plans to take advantage of new research opportunities and directions as they arise. This concept is referred to as “program-based research.” About a third of the foreign respondents (6/30), however, had trouble with that definition. For those respondents, “program-based” research was defined as a theme of research or a specific area where priorities are set by government (e.g. stem cells) and where special funds are dedicated.

3.2.1 Merits

When asked what are the merits of providing “program-based” funding (i.e., funding a program of research) rather than a “project-base” funding, respondents highlighted the following key elements about:

a) “program-based” research

- Allows for continuity in research and in training (10/30). Researchers are not only tied to “flavour of the month” type of research.
- Gives latitude and scientific freedom to the researcher to choose their priorities and pursue the most promising ideas (10/30). There is no need to be on the latest band-wagon for science.
- Provides financial stability. The prospect of long term funding acts as a safety net which gives more room to innovation and risk taking (11/30).
- Allows for flexibility and rapid shift in direction.
- Enables the researchers to lay out a long term vision of their research plans.

b) “project-based” research

- Keeps researchers on the edge.
- Forces collaborations.
- Sets concrete research objectives and covers immediate needs of a country.
- Focuses research within areas with more tangible outcomes.

3.2.2 Disadvantages

The disadvantages of providing “program-based” funding (i.e., funding a program of research) and “project-based” funding are highlighted below.

a) “program-based” research

- The lack of specificity in a Discovery Grant proposal compared to project-based proposals (e.g. NSERC’s Strategic Grants), can present difficulties for the evaluation of the science and the assessment of results (13/30).
- Difficult for New researchers to break into the system (2/30) + (1/12) – as they have not yet established a research program.
- Can create a sense of entitlement; the researcher has the impression that just making progress will result in funding (2/30).
- Funding recommendations are often tightly linked to previous award levels which limits the response to change in grant amount, by either cuts or increases (3/30);
- Might take away the excellence (1/30) – program-based funding can create an environment for training and research rather than preparing cutting edge proposals in project base funding.

b) “project-based” research

- Time consuming for the researcher who needs to write grants more often (3/30) and puts more toll on the system as it requires follow ups for very low success rates - High administrative cost (1/30)
- Favours the investigators who can write a good proposal but that might not necessarily be the best researchers.
- Bogs down the researcher in short term results – disincentive to risk (1/30) + (1/12)
- Tailoring of research topics to targeted funding (1/30) which results in less freedom and no continuity.

Canadian respondents from the public and private sectors, who are more comfortable with the concept of “program-based” research, indicated the need to have both project and program-based funding in Canada. Despite acknowledging the presence of NSERC’s Strategic grants program, they pointed out that there is not a good project-based system in Canada.

3.2.3 Facilitates or hinders research

When asked if a “program-based” approach facilitates or hinders researchers’ ability to carry out high quality research programs, most respondents said that “program-based” approach facilitates it because this approach:

- allows for more creativity and rapid shifts (4/30) + (2/12);
- allows for more risk taking and seized opportunities when these are there;
- frees up time for the researcher to do research and train highly qualified personnel – not always writing grants (2/30); and
- allows stability in funding (2/30).

Some respondents (6/42) mentioned that it neither facilitates nor hinders a researchers’ ability because excellence can be reached using both approaches. The best approach depends on the researcher and also on the needs. Some researchers excel through project-based and others through program-based.

3.2.4 Impact on training

When asked what impact does a “program-based” approach have on the training of highly qualified personnel respondents felt that the impact was, in general, positive both for the researcher and the trainees as the program creates a stimulating and rich environment for training. The following comments illustrate the positive impact of “program-based” approach:

a) for the researcher

- More flexibility in choosing the projects for the students (2/30);
- Better supervision as the researcher has more time for interaction with students (3/30);
- Gives more financial security and freedom (5/30) + (1/12) – Good incentive to attract students and facilitates the hiring of foreign students – contribution is enhanced through intellectual and cultural diversity;
- Allows for more in-depth research since no pressure to produce short term results;
- Allows to generate HQP in a wide spectrum of research areas with different technical skills.

b) for the trainee

- Gives the opportunity to the student to fully understand a particular area of research;
- Allows more integration in the research groups and with peers (undergraduate students get interested in research) – learn by osmosis (4/30);
- Allows collaboration between students – creates synergy and can build on results by exposure to other groups of research (2/30) – not limited to a specific project;

- Creates more independent individuals with more breadth, more flexibility, more mentorship;
- Allows more freedom for the students, opportunity to explore new avenues;
- For PhD student program-based funding is fabulous – more independent; can wander in their thoughts (5/30 + 1/12) – see the whole picture – key aspect of training – gets them ready for research – able to see them complete their degree – student can find their own research direction.

Some respondents indicated that a “program-based” approach was less appropriate for master students who in general need more structure and that students get limited exposure to industry and research and development activities in “program-based”.

3.3 *Adequacy of funding*

When asked how adequate the funding levels of Discovery Grants are to be able to carry out high quality research programs, about two third of foreign members and almost all Canadian respondents indicated that they were too low (20/30 + 11/12) even if some dynamics are in the favor of Canadian researchers (i.e., no overhead, graduate students better funded at the University level...).

Respondents commented on the fact that the current level is barely sufficient to support a student and some smaller grants are borderline operational. One respondent indicated that the Discovery Grants program is critical to young investigators and for the research areas that heavily rely on NSERC financial support when there is no other agency funding that type of research (e.g. pure math).

For some people it is worse as the adequacy of funding depends on the kind of science being done and what are Canada’s priorities. The monetary aspect is only one facet of the problem as the financial requirements can differ between and within disciplines (e.g., experimental/theoretical; field/laboratory). The question is whether there is a mechanism/program to support students, collaborations, buying of equipment.

A small number felt that a redistribution of funds (4/30 + 2/12) (i.e. with a lower success rate) would go some way toward addressing the issue of inadequacy of funding.

Interestingly, in spite of inadequate funding, it was believed that Canadians do more and better with the very low level of money available. The funds are used efficiently which results in very high quality research per dollar invested. As one respondent pointed out “the bang for the buck is impressive”. Several respondents (15/42) commented on how it seems that Canadian researchers can leverage to a great extent the amount distributed by the Discovery Grants program. Canadians have access to other funds and scholarships that help to build a critical mass of research funds. Even though the amounts distributed by the program are low, some

respondents indicated that the Discovery Grants program provides stability and helps maintain the vitality of the research environment.

3.4 *Best Canadian researchers and Discovery Grants*

3.4.1 Support and adequacy of funding

When asked if the Discovery Grants program supported the best Canadian researchers the vast majority of the respondents indicated that the best were supported, however, about half of the respondents felt these researchers were not supported at an adequate level.

Respondents who felt that the best Canadian researchers were supported at an adequate level cited their observations that researchers seem to receive sufficient funds to attend international conferences, develop instruments, and contribute to the training of highly qualified personnel, as evidence of adequate support.

Those who felt that the best Canadian researchers were supported at an adequate level, questioned the capability of the Discovery Grants program to support an entire program of research; it was felt that NSERC needed to look at the entire proposed suite of programs to address that question. One individual highlighted that there was a need to define adequacy as it might not be necessary to inject more money, but to re-distribute some of it (by reducing success rates), or, for example, provide better access to equipment. One or two others felt that it was not the best researchers who were in need, but new researchers; Discovery Grant funds should be seed money to support researchers at the start of their career - once they become established, their reliance on Discovery Grants should diminish.

Interestingly, a small portion of respondents with diverging opinions as to whether support for the best researchers was adequate cited the same observation - that the best researchers are able to attract a great deal of money for their research - as an argument to support their point of view. On the one hand, a few thought that support was adequate because the best were capable of attracting any additional funds they required. On the other, a few thought that support was inadequate because it only amounted to a small proportion of the best researchers' total funding, indicative that they needed more to maintain their research programs.

3.4.2 Ability to compete internationally

When asked to what extent the best Canadian researchers are able to compete internationally, two thirds of the foreign respondents and almost all Canadian respondents indicated that they were competitive. Respondents cited the contributions of their research (e.g. publications, conference participation, collaborations) as evidence that the best are able to compete at the international level.

The competitiveness seems to vary from discipline to discipline and with the type of research being proposed. One respondent believed that Canada is falling short in areas where costs of research are high as Canada is limited by the amount of its investments. Another commented that the Discovery Grants program allows the best Canadian researchers to have stable funding and enables them to do riskier research that would not be otherwise supported in a project-based research environment.

3.5 *Competitiveness of research funded by the Discovery Grants Program*

3.5.1 International competitiveness

When asked how they would assess the international competitiveness of the research currently being funded through the Discovery Grants program, about half of the foreign respondents and a vast majority of the Canadian respondents consider it to be very high. Canada is perceived to be strong in many areas and a few respondents believe that the performance per dollar invested is excellent. Notably, responses varied from one discipline to another. Canadian research has some strengths and weaknesses. In addition, one respondent indicated that the competitiveness is excellent at the international level however it has evolved beyond reciprocity in terms of collaborations (e.g. more Canadians go on international ships than the reverse). This individual felt that international competitiveness is precarious.

A few respondents pointed out that it is difficult to precisely pinpoint, however, what proportion of this success comes from Discovery Grants support compared to other sources of funding. There are no metrics to measure the impact of Discovery Grants at the proposal evaluation phase, as no one examines the previous proposal - only the most current proposal is assessed.

Another small group of respondents commented on the fact that the training provided to the student is very good and that it is a strong feature of Canadian research. In addition, the Discovery Grants program allows the researchers to make very interesting research choices. One person commented that Canadians are not always at the forefront but they develop world class expertise in more niche areas.

Only one person felt that the international competitiveness was poor and commented that NSERC's egalitarian approach results in some researchers from non competitive institutions being supported. With emphasis on geographical diversity, one cannot expect international competitiveness.

3.5.2 Impact

When asked what they consider to be the impact of such research, overall, respondents felt the impact was good. Again, the quality of contributions (e.g. publications, participation in international conferences, collaborations, development of prototypes) were cited. One person

commented that the most significant impact of Discovery Grants lies in the training of highly qualified personnel for Canada. The program favours the training of a specialized workforce and the next generation of scientists. This raises the level of education and makes for a more educated country. Another person pointed out that Canadians bring skills to international team projects that are sought by the Americans and Europeans.

3.5.3 Contribution to the advancement of research

When asked to what extent the research carried out in Canadian universities is contributing to the advancement of their field of research, respondents reiterated, for the most part, what had been discussed in the two previous questions. Canadians are making core contributions and are leaders in many fields. Results are used by other stakeholders in their day to day jobs and lead to new advancements and changes in policies. For example, in the area of catalysis, Canada has built a strong program of research due to stable source of funding. It was felt that Canada has taken a proactive approach rather than being reactive like the United States in that research area.

3.6 *Rigour of the Discovery Grant Peer Review*

Based on their experience, respondents were asked to judge the rigour of the evaluation of Discovery Grants applications. The vast majority felt that the evaluation was rigorous. Respondents were impressed with the review process and the people that were part of the evaluation. Members were considered to have great expertise, be professional and unbiased. People were described as passionate and thorough in their evaluation. Grant selection committee members were perceived as paying great care to each application (impact on career/special circumstances) and basing their recommendations on a factual and thorough discussion of the evaluation criteria.

Interestingly, a few foreign respondents noted that more influence is placed in the hands of grant selection committee members (e.g., budget, funding recommendation) in NSERC's review process. In the US for example, the allocation of funds is typically undertaken by a program officer. Respondents viewed this as a positive aspect of the Canadian review process, as they felt that scientists are in the best position to judge this particular aspect and the allocation is much more consistent when a group of people is distributing the money compared to an individual, as in the case of NSF. It should be noted, that, a small number believed that too much time was spent discussing funding levels.

Some respondents identified limitations to the Canadian peer review system:

- a) Workload (e.g., high number of applications to review);
- b) Expertise (e.g., challenges when research is outside a GSC members' main field of expertise);
- c) Human factor (e.g., ability of one member to bring the group to their point of view);
- d) Role of external reviewers (e.g., content of their review is not pertinent and too general);

- e) Content of the application (e.g., limited scientific content and low emphasis on the impact of the research).

3.6.1 Rigour compared with other grant evaluation committees

When asked if they had served on other grant evaluation committees, and how do these systems compared with Discovery Grants, only a small number of respondents were able to answer this question. As well, the few respondents who did answer had mixed views and often contrasting opinions when comparing NSERC to other agencies. For example, one person would feel that the Canadian system was less stringent than NSF or NIH, while another would feel that the Canadian system was comparable to NSF or NIH.

3.7 *Success rate*

3.7.1 Appropriateness

Respondents were asked about the appropriateness of the Discovery Grants program's success rate. About half of the respondents felt this was not a clear cut question. Some respondents felt this was more a political question as it depends on what Canada wants to achieve and the philosophy of the Discovery Grants program - does NSERC want to move forward with an elitist approach or maintain a diversified base of research capability?

About a third of respondents (14/42) believed the success rate to be appropriate when taking into consideration the three program objectives and the Canadian research environment. As pointed out by one of the respondents, the Discovery Grants program focuses on the training of highly qualified personnel and wants to maintain a diversified base of high capacity research; in that context the current success rate is appropriate.

In contrast, a small group (8/42) felt the success rate is inappropriate and that it is too high compared to other agencies. About half of these respondents felt that the success rate should be around 50 to 60%.

3.7.2 Impact of higher selectivity

When asked what they thought would be the impact of higher selectivity in the Discovery Grants program, only a small number felt it would have a positive impact - that it would improve the return on investment and increase the quality of proposals. In contrast, overall, respondents felt that higher selectivity would have a negative impact on the following aspects:

- a) Overall Canadian research context

As most of the research in Canada is currently done in universities, higher selectivity would have tremendous impact on the Canadian research system both at the training and teaching

level. By cutting non-graduate institutions for example, the exposure to science would be lessened and would impact the Canadian social tissue.

b) Diversity

A small number of respondents believed that higher selectivity would have an impact on diversity - that there would be a loss of research diversity as researchers would tend to focus more on popular topics which are not necessarily the best topics. This would in turn result in compromising the breadth of research being done in Canada. This would be particularly detrimental to research areas that rely for the most part on Discovery Grants as their source of funding as it would be difficult to get money from other sources (e.g., industry). In addition, a few respondents mentioned that higher selectivity would result in the likely loss of young investigators and late bloomers by cutting-off promising research careers. One respondent worried that researchers that have a different research philosophy (e.g., one publication every year with limited training) will be eliminated or will self-select out of the program (by not applying). Finally, some respondents commented on the possible loss of institutional diversity where people from small institutions would be cut and hence limiting the breadth of the research environment.

c) Loss of morale

A few respondents pointed out that the higher selectivity would lead to an elitist system where the researchers with the best ideas would have more resources. This would develop a culture of the haves and have not where the rich get richer. One respondent observed that "if you are an active researcher in Canada (training and contributing) you can expect to receive money. This is different than in the US where good researchers are being turned down thus abruptly ending careers. What is the point of doing research?"

A few respondents pointed out that one can not increase selectivity if other funding mechanisms/initiatives are not in place to fill the gaps (e.g. new faculty, special thematic, conference grants).

3.7.3 Proportion supported by own system

When asked what proportion of researchers (supported by Discovery Grants) would be supported under their own system, respondents had no clear answers as it was difficult to compare the different funding models. (Note that this question was not asked to Canadian respondents).

3.8 *Support of applications*

When asked to comment whether some proposals funded by the Discovery Grants program should not have been supported, respondents were divided. Interviews revealed that about half (23/42) felt that some proposals had been funded that should not have been supported.

Among those who had never observed an application that should not have been funded, respondents highlighted that excellence is the priority in the decision making and that the selectivity within the GSC is present. The recommendations made by the GSC are the result of open and frank discussions and the end result is reached by consensus. Usually, GSC members can easily differentiate between a good and a weak proposal. A few respondents pointed out that, on the contrary, they would have liked to support some researchers that did not get funded due to a lack of adequate funds (2/30 + 2/12)

Of the respondents who had observed an application that should not have been supported, all pointed out that these cases were marginal (examples ranged from one case over a three year mandate to three cases a year) and that only a hand full of them had been observed while they were sitting on the GSC. The following aspects were identified as reasons for the discrepancy between their assessment and the final recommendation of the GSC and are presented in no particular order:

a) NSERC guideline for reduced funding

NSERC has guidelines for reduced funding recommendations. In the *2007 Peer Review Manual*, NSERC instructs GSC members that they “may reduce or discontinue funding when there are higher priority demands from other equally good or more meritorious research proposals” and specific guidelines are in place to “ensure the orderly phase-out of research activities where there is a significant human resource component” for example “Grants below the average grant for a GSC may be terminated and Grants at or above the average grant for a GSC may be reduced by up to 50 per cent.” As these administrative rules put more emphasis on continuity in funding, some applications are funded at a higher level than they should or not brought to zero even though the excellence may be questioned. A few respondents (5/30) felt that NSERC rules tended to protect the students even if the quality of the proposal was questioned and allowed more senior researchers to take the Discovery Grants funding for granted.

b) Pertinence of research topics

Some respondents indicated that applications that should not have been supported were in research areas that were not relevant or had little impact or were in areas where there is duplication of research subjects.

c) Special cases

Two respondents indicated that grant selection committee members supported applications when human factors were identified such as personal circumstances or interruption in career. Respondents felt that these cases should be treated separately by NSERC.

d) Diversity

NSERC supports a diversified base of research programs and some respondents believed that researchers from tertiary institutions should not have been funded. In smaller institutions, strength lies more in the quality of training provided by the principal investigator rather than in the excellence of the science and hence if the assessment would have been solely on excellence these applications would not have been funded.

e) Inertia of the System/Entitlement

A few respondents believe that there is a feeling of entitlement towards Discovery Grants in the community and that drastic cuts are not welcomed. Researchers with the biggest grants are almost “untouchable”. However, it was pointed out that work that was stellar five years ago might not be anymore and cuts should be made accordingly. This would facilitate the redistribution of the funds (4/30). Returning researchers are often given the benefit of the doubt even though the application might not be on par with other applications in the same competition. Grant selection committee members tend to be softer on the returning applicants. However, as it was pointed out by one respondent, that in the tight current financial environment, the community can not afford that kind of decision.

f) Peer review

Some respondents pointed out that while on the GSC, members would introduce information about a candidate that was not contained in the application and hence persuaded the committee. Also, in some cases, respondents lacked specific expertise and had to rely on the other members of the GSC and hence could not really tell if the right decision was made. One respondent pointed out some members with opposing views were able to persuade the committee and change its vote.

One person pointed out that this question was a subjective one as it depends on the priorities that have been set.

3.9 *Other comments*

When asked to comment how NSERC could improve the Discovery Grants program in general, several respondents reiterated that the Discovery Grants program is unique and the most

successful program at NSERC. A few people pointed out that no dramatic changes should be made to its structure. The program allows for great flexibility and overall is a good investment for Canada. Some respondents were impressed by the Canadian system and one person qualified it as more polite, congenial and human in its approach. A small group of respondents was impressed by the emphasis placed on the training of highly qualified personnel and how it is valued compared to the United States. One individual commented that the "Discovery Grants program is unique among its kind. It serves as 'lubricating oil' in the sense that it allows for travel, collaborations and training of highly qualified personnel".

About a third of the respondents pointed to a lack of adequate funding (9/30) and that most of the problems with the system are caused by the limited money available (1/30). One person blamed the imbalance in the distribution of research funds in Canada. The Canadian Foundation for Innovation (CFI) currently receives lots of funds compared to NSERC (e.g., for equipment) (1/30). Another pinpointed the imbalance in the distribution of funds within NSERC. The reallocation of funds between grant selection committees is important and is a good mechanism that gives latitude for recognizing hot research topics. However, this is not a good mechanism for more heterogeneous groups of researchers. In addition, it was felt that this mechanism was gearing research and should be avoided in order to maintain a healthy research environment. Another individual, expressed concerns about grant selection committee budgets - that these have remained the same even though the research community has grown and that appears to have been an erosion of Discovery Grant funds in favour other programs that can be more easily "sold" to politicians.

A small group (9/42) criticized the inertia in the current review process. It is felt that it is difficult to increase the grant levels when the opportunities are there. Perhaps investing more money in the Special Research Opportunity might be a solution. A few respondents pointed out, as mentioned above, that there is too much entitlement of the funds by the researchers and that cuts should be made whenever necessary.

Other respondents (9/42) commented on the need to increase selectivity and competitiveness as it was felt that NSERC is too generous to some researchers. It was suggested that setting the bar higher and imposing a minimum grants, for example, could alleviate the problem.

4. International Review – Questionnaire

1. To begin, can you briefly tell me how familiar you are with the Canadian research system and NSERC's Discovery Grants program.

Program objectives

2. The objectives of the DGP are to: promote and maintain a diversified base of high quality research capability; foster research excellence; and provide a stimulating environment for research training. In your opinion, should these objectives be considered equally important, or should more importance be attached to one over another (and if so which one)?
 - To what extent is NSERC currently striking the right balance between supporting a diversified base of high-quality research and fostering research excellence?
3. In your view, what are the merits of providing "program-based" funding (i.e., funding a "program" of research) rather than "project-based" funding?
 - What are the disadvantages?
 - Does a "program-based" approach facilitate or hinder researchers' ability to carry out high quality research programs? Why is that?
 - What impact does a "program-based" approach have on the training of highly qualified personnel?

International competitiveness and adequacy of funding

4. How adequate are the funding levels of Discovery Grants to be able to carry out high quality research programs?
5. In your opinion, is the Discovery Grants program supporting the best Canadian researchers?
 - Are they supported at an adequate level?
 - To what extent are these researchers able to compete internationally?
6. How would you assess the international competitiveness of the research currently being funded through the Discovery Grants program?
 - What do you consider is the impact of this body of such research?
 - To what extent is the research carried out in Canadian universities contributing to the advancement of your field of research?

Rigour of Discovery Grant Peer Review

7. Based on your experience, how would you judge the rigour of the evaluation of Discovery Grant applications? If you have served on other grant evaluation committees, how do these systems compare with Discovery Grants?
8. How appropriate is the success rate of the Discovery Grants program?
 - What do you think would be the impact of higher selectivity in the Discovery Grants program?
 - What proportion of the researchers supported by NSERC's Discovery Grants program do you think would be supported by your own system?
9. Have you ever observed proposals funded by the Discovery Grants program, which in your opinion, should not have been supported? If so, why is that and how frequently has it occurred?
10. Finally, based on your experience what could NSERC do to improve the program in general? Do you have any other comments on the Discovery Grants Program, its philosophy, its review process, etc?

Thank you for taking the time to answer our questions. Your comments will be extremely useful for us.