



## **International review of the Discovery Grants Program**

### **Summary of Feedback provided by non-Academic Organizations and Individuals**

Produced by the

Research Grants & Scholarships Directorate  
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As part of the International Review of the Discovery Grants Program, NSERC contacted 103 companies and federal or provincial government departments to seek their input on the following questions:

1. NSERC is considering two distinct approaches to how it funds research and the training of highly-qualified people (HQP) at Canadian universities. One approach would provide more funding in selected areas in which the country currently excels to fewer researchers than are currently funded. The other approach would strive to maintain a broad base of research expertise across the country and across all disciplines so long as the research meets recognized standards of merit. The second approach is closer to what the Discovery Grants program currently tries to achieve.

**Which approach do you favour, and why?**

2. NSERC's Discovery Grants program has 3 objectives: 1) promoting and maintaining a diversified base of high-quality research capability in the natural sciences and engineering in Canadian universities, 2) fostering research excellence, and 3) training HQP.

**a) In your view what is the appropriate balance between the first 2 objectives?**

**b) To what extent are the 3 objectives of the Discovery Grants program suited to the Canadian context and your organization's needs for research expertise, knowledge transfer and HQP?**

3. The International Review will assess the contributions of Canadian researchers to the global knowledge base.

**In the disciplines or fields most closely aligned to your organization's interests, to what extent is the research supported through the Discovery Grants program having an impact on the international scene?**

Companies and government departments were selected on the basis of their participation in NSERC collaborative and scholarship and fellowship programs, hence having some familiarity with NSERC and some involvement in research. Of 103 organizations contacted one respondent indicated an inability to participate due to insufficient awareness of the issues and twelve were either out of office or had email bounce back. Of the remaining participation pool of 90 we received 18 responses (20%), which is within the typical range for surveys of industry. This is certainly not meant to be considered as a representative sample. This exercise is intended to complement the other inputs associated with the International Review and to get some qualitative views from the user sector.

Respondents were equally divided as to the approach that NSERC should take for the Discovery Grants Program. Nine wrote in favour of a broad-based approach while nine supported a more focused direction.

In general, those who supported a broad based approach stressed the importance of being flexible to take advantage of unforeseen opportunities, of being able to respond to rapid change, of avoiding cliques, of having a foundation from which to draw research expertise in areas that may become strategic.

Those who favoured a more focused approach indicated that with limited resources Canada should not try to compete in all areas of research, that we should concentrate on areas where there is a reasonable expectation of scientific leadership or commercial return on investment, that we should focus on finding solutions for industry or for national or international needs.

Some who supported the latter, more focused approach did recognize that some degree of broad based support should continue.

On the issue of the balance between promoting and supporting a diversified base and fostering research excellence, the majority of respondents wrote in favour of a more or less equal degree of importance. One favoured supporting a diversified base while five favoured supporting research excellence at the expense of a diversified base.

**Natural Sciences and Engineering Council of Canada**  
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***Q1) NSERC is considering two distinct approaches to how it funds research and the training of highly-qualified people (HQP) at Canadian universities. One approach would provide more funding in selected areas in which the country currently excels to fewer researchers than are currently funded. The other approach would strive to maintain a broad base of research expertise across the country and across all disciplines so long as the research meets recognized standards of merit. The second approach is closer to what the Discovery Grants program currently tries to achieve.***

***What approach do you favour, and why?***

NSERC can and should foster a broad range of activities that will give the country flexibility and agility to take advantage of unforeseen opportunities, particularly in Discovery Grants; isn't that the point? There is a danger of becoming too narrow if a public funding agency "picks winners" in terms of fields of expertise. Government departments are already in the business of targeting strategic areas that are of importance to the country; it would be a mistake to have everyone approaching the future in the same way. It may be useful to discuss with such targeted agencies what their priorities are for periods of 3, 5 or 10 years and perhaps emphasize those if that's what they want.

On the assumption that the Canadian Networks of Centres of Excellence will continue to exist and therefore provide funding in selected areas, we are of the opinion that the second approach should be favoured. Given the limited resources it could also make sense to somehow limit how broad the base of research should be. Then the problem of determining key areas could be a challenge. Through workshops, panels of researchers and/or similar events, the researchers themselves should be involved in proposing how broad the base of research should be. Research, by its very nature, being open one should be very careful in excluding certain areas. Among other things, the second approach would reduce the possibility of having a "closed club" of researchers controlling R&D in Canadian Universities and could ensure that new researchers not in the club be able to produce high quality research and/or HQP. Putting too much emphasis on a specific area of research could also lead to funding bad quality research just because it is in the selected area. In conclusion, the second approach in conjunction with centres of excellence would provide a good balance.

In my view focusing on funding in areas where we are (somehow) identified as excelling is a recipe for disaster. It will simply lead to a series of small self perpetuating and self serving cliques, something to which a relatively small community like Canada is especially vulnerable. I would draw your attention to the doors that were opened by the Strategic Grants program, which encouraged new initiatives that would not have been funded by the conventional NSERC program.

I prefer a broad approach due to the rapidity of change facing industry today.

Alberta recognizes that NSERC's role in building research excellence and capacity in areas of strategic importance is critical if Canada is to remain competitive in leading and attracting innovation and research expertise. In our view, NSERC's historical role of supporting a broad base of scientifically excellent research is critical for maintaining the sustainability and growth of the university research enterprise across the country. In Alberta, researchers look to NSERC's Discovery Grants program as being a comprehensive and flexible support mechanism that is core for enabling them to perform discovery research in the natural sciences and engineering fields. Other funding programs available to Alberta researchers are designed to either complement NSERC's Discovery Grants program, or to target specific research areas. The funding of broad research excellence is thus crucial for the sustainability of the university research enterprise across Alberta and beyond.

We favor the second approach, closer to what the Discovery Grants program currently tries to achieve. Smaller groups tend to maintain more independence, are more open to collaboration, and provide more diversity in terms of projects and research areas—which we consider is beneficial for industrial interactions. From an education point of view and for the training of HQP, graduate students in smaller groups tend to have better access to primary investigators than in large groups.

We, at (Company), strongly favor the broader base of research funding across the country. Although industry may participate in specific research projects conducted within the university, this research does not encompass all of the technologies necessary for a company to compete in a world marketplace. Generally speaking, the results of recent research form only a small part of the technical plans formulated by a company in a competitive environment. The contribution from universities is either new knowledge or the results from an agreed upon collaboration. They are very seldom at the heart of any corporations annual business plan. They may, however, form part of a long term strategy along with other initiatives by the company. The notion that university research should be aligned with a few selected areas, in which Canada may have a business lead, is completely wrongheaded. Planned economies simply do not work. Businesses must remain very flexible and responsive to immediate conditions which can change in a very short time. Consider the rapid rise in the value of the Canadian dollar and the effect it has had on Canadian businesses. No amount of planned research could effect the fortunes of such businesses in the time scales encountered. Then we have the problem of directing university research in response to industry needs. This will quickly become some form of national bureaucracy no doubt populated with the usual mix of government / university / industry. The notion that such a body could direct university research for the benefit of the country is downright silly. Such an approach would simply devolve into a political pork barrel. Business devotes its attention to the production of devices and services which are in demand today. They are, or should be, constantly on the watch for new technologies/ideas that will provide the basis of products and services for the future. This is tough work. It is even tougher to recognize the potential of embryonic technologies as typically found in research laboratories in universities. If this was an easy task, all of us would be rich and famous. However, our best chance for success is still described by the axiom of engineering design "good designs are evolved from many ideas. It is more important to have many ideas than it is to have one so called good idea".

This suggests maintaining a broad base of research inquiry rather than a focus on a few. There is far too much emphasis, today, on commercialization of university research than is good for the country. This is something best done by entrepreneurs. At (Company) we do not ask our creative inventors/designers to sell. They are no good at it and their time is much more profitably spent in product development. This seems to be a lesson lost on the people who direct funds to university research. I do not understand the current fixation by university funding agencies on the matter of creating highly qualified people. It is generally accepted that higher education is of necessity quite specialized. Business has long ago accepted the fact that an individual's area of training becomes irrelevant within five years of the graduate joining a commercial organization. What remains, therefore, is the basic capability to conduct research and to think at a level that provides the company with some competitive advantage. The notion that an individual should obtain a higher degree in an increasingly narrow element of a particular field is contrary to the kind of interdisciplinary development that is so valuable to a company operating in the marketplace. It is our belief that freeform research, regardless of the topic, is the best training ground for such minds. Objective, independent enquiry into the unknown develops skills that survive. I am skeptical that a university can provide training in the other areas required by business.

If we focus our efforts too heavily on areas in which we are a leader today, we may find ourselves with expertise gaps in future years in fields of relevance to Canada. Given that resources are limited, it is important to concentrate our efforts in order to be a leader in fields that have the greatest impact for Canada, while allocating less funding to other fields on a more diversified basis. It is also important to target research areas and not only research scientists.

The second approach is favoured.

With global R&D competition increasing and the Internet eliminating barriers to entry associated with location and knowledge transfer, Canada should focus the majority of its limited R&D resources to effectively establish itself as world wide experts in selected areas. Otherwise its R&D initiatives will result in incremental advances that support the R&D initiatives of other nations that have established themselves as world wide experts in selected areas. However, some funding should continue to be allocated for new emerging research areas in which Canada could potentially excel. Consequently NSERC needs to determine whether 'focusing' the Discovery Grants Program or redistributing funding between the Discovery Grants Program and other programs such as the Strategic Grants program, will help establish Canada as world wide experts in selected areas without excluding funding for new emerging research areas in which Canada could potentially excel.

I favour the first approach. I think however, that there should be a recognized "list" of research areas that are deemed desirable for Canada. This would help to sustain and/or build a knowledge base in a broad area and not remove the partnership ability with companies that can benefit from the research as well.

I favour the first approach over the second. But, I would actually prefer a third version - I would prefer to bias funding toward research projects that have a higher potential to provide a benefit to Canada in terms of economic value, societal benefits, standard of living, health, etc. Fundamentally, Canada cannot afford to compete with leading research elsewhere in the world in every discipline. In my opinion, our investments must be focused and prioritized - which supports option 1, but I would go a step further than that and also prioritize our investments based on the returns.

In summary, I am more supportive of research which leads to faster commercialization of anything - pharmaceuticals, vaccines, medical devices, electronics, agricultural/food, environmental, etc., etc. - that would solve social problems and help move the Canadian economy forward. I believe too much excellent Canadian research stays trapped inside universities for too long, due to IP issues, and when it 'escapes' it is acquired by others (USA?) for downstream commercialization, and the wealth/tax benefits that provides. We have to be able to do a better job in Canada.

I favour the first approach because, in my view, the Centres of Excellence are in a better position to help industry find rapid and effective solutions to our problems. It is a question of helping firms by training experts to address narrowly targeted problems, not general questions.

(SBDA) believes that funding should be targeted at those selected S&T areas in which the country excels, is important strategically and can succeed in the future. This is consistent with the new federal S&T policy in which four major areas have been identified and also with the approach taken by other technologically successful countries such as Japan and Korea.

I agree with the proposed new approach, to direct more funding towards selected areas in which the country currently excels. We are a small country, and we cannot afford to train students in areas where the only employment prospects are in other countries, or to develop technologies where there is no hope of developing a Canadian receptor capacity or market. That being said, one purpose of the Discovery Grants should remain to anticipate areas of future importance to Canada.

We believe that Canada's S&T community is too small and its S&T resources too few for NSERC to focus solely on funding a broad base of research expertise across the country and across all disciplines. We are therefore in favour of a two pronged approach to research funding in which NSERC would provide approximately two-thirds of its grants across a wide range of disciplines (not necessarily all) and one-third to strategic areas in which Canada is either a global leader, has the potential to be a global leader, or needs to improve its standing to address national priorities. In both of these cases we believe that excellence (as measured by international standards) should be the primary criteria for awarding research grants (with the possible exception of adopting a standard of national excellence if Canada needs to develop or revitalize a research area to address national priorities). Of course when funding research closer to the development end of the R&D spectrum, linkages with possible end users should be an additional criteria. Strategic areas should be developed in consultation with the broader S&T community and the Canadian public. They should be viewed as a long term investment and reviewed periodically, possibly every five years. Since research is not simply done to advance knowledge but to advance the use of knowledge, we also believe that strategic grants should take a systems approach to funding knowledge along the innovation spectrum from basic research to development, design, and commercialization.

The approach that would provide more funding in select areas of excellence in which research needs are established seems to be more preferable. Research funding should work towards the greater goal of solution for national and international needs, and not just for the sake of research.

<p><b>Q2) NSERC's Discovery Grants program has 3 objectives: 1) promoting and maintaining a diversified base of high-quality research capability in the natural sciences and engineering in Canadian universities, 2) fostering research excellence, and 3) training HQP.</b></p>	
<p><b>a) In your view what is the appropriate balance between the first 2 objectives?</b></p>	<p><b>b) To what extent are the 3 objectives of the Discovery Grants program suited to the Canadian context and your organization's needs for research expertise, knowledge transfer and HQP?</b></p>
<p>I don't see that there is a choice to be made; they can and should be done simultaneously. Maybe I don't understand the question.</p>	<p>They are reasonably well suited to our need for research expertise and training HQP. As a government department, we only get indirect access to these programs, but it's feasible to align with qualified recipients to advance work in some of our priorities, but not all. Knowledge transfer is somewhat trickier, since it sometimes requires working together for longer periods to achieve in depth understanding of the context.</p>
<p>This question is very close to the first question. It would require a look at the Discovery Grants Program in the larger context of all the research funds in Canada. The second objective should impose a restriction on the first one. Diversification will be ensured as much as excellence is met. A 50/50 split could be envisaged.</p>	<p>The objectives of the Discovery Grants Program are parallel to some of our objectives. You can find in Appendix A, a summary of the various objectives of each annexe of our Class Grants and Contributions Program.</p>
<p>Research excellence is the only criterion to use. However given a choice between two equally good proposals one of which goes down a new road and one of which focuses on an existing path, clearly the new direction should win out.</p>	<p>Sorry, I have no comment here.</p>
<p>Both are of high importance so I suggest equal emphasis</p>	<p>I feel than a HQP is the product of the university and it is the job of industry to orient the HQP into the fast pace and ROI focus needed in industry</p>

<p>In the second question of your survey, you asked about the balance between NSERC's two objectives: promoting and maintaining a diversified base of high quality research capability and fostering research excellence. The third objective embedded in this question relates to the training of Highly Qualified Personnel (HQP). Alberta supports all three of NSERC's objectives and views them to be interdependent. Research excellence should be implicit in a diversified base, and be recognized and rewarded. The diversified base is critical to the overall research enterprise and necessary for fostering and building selected areas of strategic priority that arise across fields of endeavour. The three objectives are thus fundamental and equally important for enabling NSERC and its partners to collaboratively build research capacity, knowledge transfer, and HQP for Canada.</p>	
<p>We would suggest a 50:50 balance between targeting funds towards a diversified base and fostering centres of research excellence.</p>	<p>All three objectives are highly important.</p>
<p>The basis of this question is puzzling. I am unable to distinguish between high-quality research capability and research excellence. I can only conclude that one is immediate and that the other is a reputation obtained from previous effort. From industry's perspective, universities need to continue with their inquiries into the natural sciences and engineering disciplines. In that context, they need to do the very best work that they are capable of doing. From industry's perspective, any result obtained from university research is half-baked. It requires considerable investment of money and time to convert such an idea into a commercially worthwhile enterprise. In that context, the prize to industry is the existence of the capability. Finding a university researcher working in a field that is relevant to a company such as (Company) is a wonderful discovery. That capability forms the basis of a partnership. Research excellence would not provide a basis of conversation between (Company) and the researcher. Excellence would simply be assumed to exist.</p>	<p>To the extent that I understand the question, I believe that the three objectives of the discovery grants program are well suited to (Company) needs for research expertise, knowledge transfer and highly qualified personnel. The reader should be reminded that in a fiercely competitive environment, a company cannot afford to invest the amount of time that is required to provide direction to a university researcher. This is good and bad. On one hand, any project is likely to wander. On the other hand, a certain amount of confusion is not only good, it is necessary for exploratory moves. There are commonly stated criteria for success in a competitive business. These are known as the 3 C's, Credibility, Capability and Capacity. It is believed that these criteria can be applied to universities, their research and their personnel. In large measure, the organization provides the credibility-- after all, it is a qualified university. The capability rests entirely with the researcher and his/her team. And capacity defines the number and quality of the students currently enrolled. Knowledge transfer is always assured - Hire the graduate!</p>

<p>As mentioned in the last question, I would favour the second objective, with less funding for the first objective.</p>	<p>NSERC should promote funding in fields that are relevant to Canada's economic and social development. I would therefore add a fourth objective, namely promoting research that is relevant to Canada's economic and social development. This objective would ensure a better fit between the needs of Canadian organizations and research, and would more widely promote the value of research combining the academic impact and the economic and social potential. In addition, this criterion would ensure the relevance, in this context, of the training of HQP and therefore of knowledge transfer.</p>
<p>50/50</p>	<p>Well suited, currently Imperial Oil provides leveraging support to the Collaborative Research and Development Grants given for specific research projects.</p>
<p>Neither objective should be abandoned at the expense of the other. However, a larger proportion of NSERC's resources/funding should be directed towards fostering research excellence in selected areas in which Canada currently excels. Whether this is achieved by 'focusing' the Discovery Grants Program, or redistributing funding between the Discovery Grants Program and other programs such as the Strategic Grants program as mentioned above, needs to be considered.</p>	<p>The Discovery Grants program helps (Organization) fulfill its mandate to investigate industry problems/issues in the ICT space. It does this by supplementing the funds (Organization) directs towards Canadian University researchers so they can investigate industry problems/issues identified by (Organization). Through this process the Discovery Grants program helps (Organization) facilitate knowledge transfer from academia to industry, often in the form of HQP. To better help (Organization) fulfill its mandate, it would benefit (Organization) if the Discovery Grants Program emphasized funding industry relevant and real-life ICT applications.</p>
<p>70-30 split. Capability and knowledge management is a critical issue facing industry in Canada and the world today. It is key for us to maintain a solid base capability in this area in Canada.</p>	<p>My organization is not a research based organization however, we have an ongoing need for HQP that typically come from the research field.</p>

<p>I see no point in maintaining a balance at all. I believe we should be fostering excellence, and in particular fostering excellence that has value to Canada.</p>	<p>HQP is much more important than the other two objectives. We do not waste much time looking for output from research that we don't fund because our experience suggests that there isn't much value in it. We fund the research that makes sense to us, and we look for researchers who are willing to work on the things that we feel are important. However, we do hire HQP that results from research in low value areas. The capabilities of the people are much more important than the specific knowledge they possess from their university activities. Therefore, we are ok with this low value research as long as we don't have to pay for it and as long as it continues to produce outstanding HQP. However, the same HQP value could be generated while working on research programs that do have value so it seems like a considerable waste of a great opportunity when we don't do that.</p>
<p>My research related observations are based solely on what I see in our (Manitoba) region, and my limited knowledge/perception of how some universities, like Waterloo, seem to advance their research much better/faster than most other Canadian universities. Many academic professors/administrators speak of "academic freedom", whenever anyone mentions research which actually lead to solving specific medical/health, agricultural or industry problems, and which may have lead to some form of commercialization of a drug or a technology. Given the USA spends in excess of \$14B annually in cancer research, Canada has along way to go compete with their research budgets. For this reason, many businesses believe community colleges are critical to solving the slightly more mundane research problems they have.</p>	
<p>60 - 40 percent. I don't see the difference between the second and third objective. If excellence is achieved, the personnel will be highly qualified.</p>	<p>Our industry is suffering from a lack of knowledge transfer. It is a chronic problem, particularly with the industrial research centre closures and the ageing of the remaining experts. I believe that the expertise is there and that the personnel is highly qualified but is not always able to quickly transfer its findings and research results, something other countries seem to do better than us.</p>

<p>Because (SBDA) believes that the Discovery Grants program should be targeted at selected S&amp;T areas as answered in question 1, then the main focus should be on research excellence in those areas. All three objectives are suited to the Canadian context and to our own organization. However the bottom line is that when (SBDA) is seeking research partners or hiring new staff, we try to identify HQP who have demonstrated competency and excellence in the technical areas of interest to us. Most industries will do the same.</p>	
<p>In my opinion, training the next generation of HQP should be the main objective of the Discovery Grants program. However, research excellence has to underpin all decisions made about research grants. There is no point in maintaining an average diversified capacity in our universities.</p>	<p>As the federal government's largest research organization, we mainly look to NSERC and the universities to provide us with the HQP that we will need in our programs. Our researchers also look to the universities for complementary research expertise. In answer to your question about the suitability of the three objectives in the Canadian context, it is clear that Canadian federal and provincial governments have invested heavily in universities as engines of innovation. The Discovery Program might want to look at its goals in this context, and determine if they will allow NSERC and the universities to demonstrate that the investment in basic research has paid off in terms of innovation.</p>
<p>As noted above, we believe that NSERC should fund research on the basis of international excellence (whether in strategic areas or across a broad range of disciplines) and not on the basis of geography. Canada requires a certain base of expertise in a wide range of disciplines (as well as advanced training in those disciplines), but we will only truly excel in a few areas and therefore need to identify and fund these areas at a higher rate than others (as also noted above, these areas would need to be reevaluated periodically).</p>	<p>(SBDA) is equally concerned with the funding of research and the training of HQP as it is difficult, if not impossible, to separate the two. We have a number of close relationships with university researchers and many of our research staff have joint appointments with universities. We also rely on highly skilled graduates that we hire each year. (SBDA)'s in-house research programs are likely applied project-based research. We rely on researchers funded through NSERC's Discovery Grants program as an important source of basic knowledge, which we access both through the literature and through collaboration.</p>
	<p>Major funding emphasis should be placed on the development of HQP's in collaboration with industries to ensure that HQP's are fully prepared to contribute in the real world.</p>

**Q3) In the disciplines or fields most closely aligned to your organization's interests, to what extent is the research supported through the Discovery Grants program having an impact on the international scene? These issues are broad and have multiple dimensions, including regional availability of research expertise and trained personnel, institution size, support for new versus established researchers, impact on national and international collaboration and on HQP training, to name but a few. It would be useful to the International Review Committee if you can provide specific examples in which your organization has benefited (or not) from involvement with NSERC funded researchers and students, and the rationale for the positions taken**

We have no direct support through this program, it is only indirect through collaborative activities with Universities.

Alberta's researchers continue to be competitive and successful at NSERC, securing 10.5% of the total amount available in the 2006-07 Discovery Grants - Individual Awards competition. Many of these researchers are also supported through such venues as Alberta's research institutes, Alberta Ingenuity, and the informatics Circle of Research Excellence (iCORE). A good case in point: One of the 2006-07 Discovery Grants awardees, Dr. Michael Brett of the University of Alberta, has also been successful at securing significant funding from Alberta. In the most recent Alberta Science and Research Investments Program competition, Dr. Brett and his team were awarded over \$2 million to build the capacity needed for enabling the team's research. The award is being used to purchase equipment for the Micromachining and Nanofabrication Facility (NanoFab), to meet the needs of more than 550 researchers, industry, and government. With this new infrastructure, Alberta will be home to one of the top five such laboratories in North America. Dr. Michael Brett's early exploratory work in materials structure, properties, and testing, was supported by the Discovery Grants program. Thus, without the crucial early support provided by the Discovery Grants program for Dr. Brett's research, the internationally-recognized NanoFab facility and the research that its scientists generate may not be happening in Alberta. Dr. Brett's example emphasizes the importance of NSERC's Discovery Grants program in supporting discovery and exploratory research based on scientific excellence and the subsequent growth and impact that such "seed" investments make.

I want to underscore that Alberta recognizes the exponential increases in demand on NSERC's budget over the past ten years. The research infrastructure investments made by the Canada Foundation for Innovation and the provinces have boosted research capacity in Canada, with a corresponding increase in demand for operational funding. A primary component of operational funding for a researcher in the natural sciences and engineering fields is the support provided through the Discovery Grants program. We recognize that NSERC is attempting to address this situation without the ideal budget increases required to fund both broad research excellence and areas of critical capacity. Hence we would like to emphasize that the funding of broad research excellence is crucial for the sustainability of the university research enterprise across Alberta and beyond. Thank you for inviting Alberta's input during the international review of the Discovery Grants program. We appreciate the opportunity to be included in NSERC's deliberations and want to thank you for the tremendous impact your suite of programs and activities has and continues to make in Alberta and Canada.

<p>Researchers in Canada certainly have international renown in the stem cell field. However, we are not privy to the extent their work is funded by the Discovery Grants program.</p>	
<p>This is a very difficult question for someone in industry to answer correctly. (Company) involves itself in technologies that are useful in diagnosing problems with rotating equipment. 25 years ago, the idea that you could diagnose internal problems of equipment from field measurements was considered absurd. Today, it is the most significant development program currently on the books of western nation's military organizations. Some of the advances in measurement technology (and the know-how to interpret the data) that has allowed these ideas to succeed are a result of collaborative effort between (Company) and several Canadian universities. In essence, the university collaborators did the basic enabling research and (Company) was able to adapt that knowledge to new products. Based on inquiries that (Company) has made of researchers in Europe (in Germany and UK) the work conducted in Canadian universities is entirely comparable and in some cases occurred 10 years in advance of others. Having made that statement, we are well aware of the narrow disciplines within which (Company) works and of the risks that are incurred by trying to generalize our experience to other areas. About the best that we can say is that we compete successfully in countries such as USA, Germany, UK, Italy, Japan, Norway, Sweden and Canada</p>	
<p>It is the economic and social impact that's important to us. The impact of the research on the international scene has little bearing on its usefulness to Canadian businesses.</p>	<p>We favour an approach combining research through CRD and knowledge transfer through industrial scholarships. We currently use this approach with Professor Pierre L'Écuyer of the Université de Montréal.</p>
<p>The industry relevant problems/issues in the ICT space that the Discovery Grants program helps Canadian University researchers investigate are relevant globally and therefore have a high impact on the international scene. For example, through (Organization) and the Discovery Grants program, Canada has established itself as a world wide expert in the design, operation, and maintenance of mesh restorable transport networks.</p>	

<p>There are some areas of particular interest and application, e.g. most of the environmental projects. (effects of ionizing radiation on non-human biota)</p>	
<p>Quite frankly, the impact of Canadian research on the international scene is minimal and should not be a major objective. If it happens, then great. But Canada's research spending is insufficient to make a meaningful impact, nor should it be designed to. Canada's funding should be directed at things that have the potential to benefit Canada and provide a return on the investment to the Canadian taxpayers who fund it. It would be a complete shame if we only look upon Canadian Research as though it were a global or even local charity. Our research capability and our HQP are precious resources that should not be wasted on low value research or spread glibly across the globe.</p>	<p>Canada's economy is deteriorating. Jobs are being lost to countries that are focusing on improving the value of what they do from every perspective - which includes academic research and the development of HQP. We must learn to use our precious resources wisely and to focus them where they can do the most good. If we don't do that, it will not be long before we won't have the money or the resources to do anything anymore and the whole discussion will become moot. We cannot be all to everyone and still do a good job. Our biggest problem is that we lack the spine to make tough decisions. We would rather be nice to everyone and fund everything - all to the detriment of everyone and everything. We need to learn how to say no to more of what does not pay off, and yes to more of what does.</p>
	<p>Given your explanation, I should participate in the survey. However, the problem I still see is that I am not involved in, nor am I responsible for, any direct (Company) research. Therefore, I am not sure my pure research responses are directly relevant to the questions asked, nor would my responses properly represent (Company)'s research position. The Pablum baby food development is a historic example of some Canadian research which worked well (solved a child health problem, and was commercialized to serve a social need). Outside of the Blackberry example, there are few Canadian research activities most people can cite that have actually lead to significant wealth being created - wealth which helps pay taxes and fund more research activities. I think it is important that both the public, and the research communities, better understand that linkage. I realize this may not represent popular opinion.</p>
<p>We continue to ask universities to work in very specific areas that are related to our Canadian research. When the results are published, we don't have any problems because ideally the solutions have already been provided and it is understood that scientists must publish their latest research.</p>	

<p>(SBDA) has benefited greatly from NSERC-funded researchers and students from across Canada and in particular, from the two local universities who both have telecommunications-related R&amp;D programs. In fact, many students undertake their post-graduate research activities at our labs and work directly with our project teams. In addition, (SBDA) has numerous research collaborations with professors and some (SBDA) researchers are adjunct professors who are part of the university community. Some of these (SBDA) adjunct professors have received Discovery Grants as part of their work with the universities and these projects are directly related to our research program. (SBDA) also has numerous international collaborations with organizations across the world and students work on those projects with our staff.</p>	
<p>Given the breadth of my organization's research interest, from astronomy to ocean technology, this is not a simple question to answer. Astronomy is certainly one area where the Canadian impact is recognized, and (SBDA) works with the universities in providing access to international astronomy facilities. In entering new areas, such as nanotechnology, (SBDA) will be making targeted investment in research. Canada on the whole has the potential to make a strong contribution to nanotechnology, but this will be undermined if non-strategic, small grants are sprinkled across the country.</p>	
<p>It is difficult to assess this accurately, but if we assume that most university research in environmental science in Canada is funded through NSERC Discovery Grants, then this program is having a significant impact on international science. A recent bibliometric study of environmental science in Canada that we commissioned showed that Canada has ranked third in papers in environmental research over the last 25 years. In terms of numbers of papers per capita Canada ranks second in the world. Canada also ranks second in scientific impact in this field. The report showed Canadian specialization in ecology &amp; biological resources and pollution, environmental toxicology &amp; health. It also showed an above average scientific impact in almost all environmental areas.</p>	<p>(SBDA) is the lead Canadian institution in the number of papers produced in environmental science and is the number one collaborator with most of the other top producers in this field in Canada (including the University of British Columbia, the University of Toronto, McGill University and the University of Alberta).</p>
	<p>In this context the NSERC programs on IPS, Industrial Post-Doctoral and Undergraduate Research Awards, must be increased to make a greater impact in terms of training and real world knowledge.</p>