Consultation on the Canada Foundation for Innovation's fund architecture

A discussion paper

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INNOVATION.CA

CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION

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With the contribution agreement now in place with the federal government for the allocation from the 2015 Federal Budget, it's time to consult the Canadian research community on **potential adjustments to the Canada Foundation for Innovation's (CFI) core funding mechanisms:** the Innovation Fund, the John R. Evans Leaders Fund, the College-Industry Innovation Fund, the Cyberinfrastructure Initiative and the Infrastructure Operating Fund[1]. This follows the CFI's long-established practice of consulting the research community and its key stakeholders following a new funding allocation. This consultation will help determine how the CFI's suite of funds can best meet the needs of the full spectrum of institutions across the country. It also provides us with an opportunity to seek input on a few **key strategic issues** of importance to the research community and other CFI stakeholders.

The agreement with the Government of Canada establishes the CFI's overall objectives and expected results from the funding provided to institutions:

OBJECTIVES: to enhance the capacity of institutions to…

- Support economic growth and job creation, as well as health and environmental quality through innovation
- Increase Canada's capability to carry out important world-class research and technology development
- Expand research and job opportunities by providing support through research infrastructure for the development of highly qualified personnel
- Promote productive networks and collaboration among Canadian universities, colleges, research hospitals, non-profit research institutions and the private sector

EXPECTED RESULTS: to enhance the capacity of institutions to…

- Attract and retain the world's top research talent
- Train the next generation of researchers
- Enable researchers to undertake world-class research and technology development that lead to social, economic and environmental benefits for Canada
- Support private sector innovation and commercialization

[1] The CFI is currently conducting a separate targeted consultation on the Major Science Initiatives Fund (MSI).

The agreement with the government of Canada also sets the amounts allocated to each of the CFI's funding mechanisms as follows:

- **$258,000,000*** for the John R. Evans Leaders Fund (JELF) for a three-year period covering 2017–18 to 2019–2020. This represents yearly investments of approximately $86 million ($66 million in research infrastructure and $20 million in generated Infrastructure Operating Fund (IOF) money);
- **$552,000,000*** for the next Innovation Fund (IF) competition, to be launched in early 2016, with funding decisions expected in June 2017. This represents an investment of approximately $425 million in research infrastructure and $127 million in generated IOF funds in the next competition;
- **$75,000,000*** for future Cyberinfrastructure Initiative competitions;
- **Up to $45,000,000*** for future College-Industry Innovation Fund (CIIF) competitions; and
- **Up to $400,000,000** for the next Major Science Initiatives (MSI) Fund competition covering the five-year period between 2017–18 and 2021–22, with funding decisions expected in September 2016.

*These amounts include Infrastructure Operating Funds (IOF).

Within the limits of the agreement and as part of our commitment to continuous improvement, the purpose of the consultation is to:

- Identify and consider adjustments to improve the design and delivery of our funds;
- Identify opportunities for better alignment with institutional needs and evolving priorities; and,
- Encourage the development of research infrastructure proposals of the highest quality, in order to better enhance the capacity of institutions and their researchers to conduct world-class research and technology development.

The sections below identify a number of core issues and key questions to help stimulate and guide discussions during the consultation meetings this fall. These discussions will help inform program design and delivery improvements, as well as identify emerging opportunities and challenges that may shape or guide CFI strategic directions. CFI staff will meet as many stakeholders as possible during these consultations. These consultations will include a series of meetings across the country and a few webinars.

As well, the CFI invites institutions and CFI stakeholders to submit written comments ***by November 30, 2015 to*** consultation@innovation.ca**.**

JOHN R. EVANS LEADERS FUND (JELF)

At a time of intense international competition, the John R. Evans Leaders Fund (JELF) helps institutions attract and retain the very best of today's and tomorrow's researchers. The JELF is a critical strategic investment tool designed to enable a select number of an institution's excellent researchers to undertake leading-edge research by providing them with the foundational research infrastructure required to be or become leaders in their field. The JELF is not meant to be a general fund for filling gaps in existing research infrastructure, nor should it be viewed as a means for funding relatively inexpensive equipment, research tools and instruments (e.g. below $50,000).

The new allocation will enable the CFI to make investments at a rate of approximately $86 million per year ($66 million capital + $20 million of generated IOF) over a three-year period (2017–18 to 2019–20). This represents a $20 million increase from the overall annual allocation during the 2014-15 to 2016-17

period. The CFI wants to ensure that the JELF remains a valuable strategic tool for institutions to help build and strengthen their research capacity, regardless of the institution's size or location.

Some observations

The proportion of "attraction candidates" versus "retention candidates" has remained relatively stable over the past five years at 45 per cent and 55 per cent respectively. We also note that "years since PhD" has been quite stable for attraction and retention candidates over the past 5 years, having only slightly increased by one year, from seven to eight for attraction candidates. We have also started to examine the proportion of attraction candidates who have received JELF awards that have held Tri-Council funding in the two-year period preceding and following the date of the JELF award. Preliminary findings for 2011-12 indicate that the "attraction candidates" funded under the JELF, 84% per cent had Tri-Council funding in the two-year period preceding and following the JELF award.

In addition, the CFI is increasingly concerned about the administrative burden and costs associated with making small-scale awards, and particularly those that are not obviously aligned with the strategic objectives of the JELF. The CFI has looked closely at these small-scale JELF awards and since 2014, 25 awards have been issued for amounts under $50,000. Somewhat surprisingly, 21 of these small-scale awards are to large institutions.

Some key questions related to JELF

- Has the use of the JELF changed at your institution over the past few years? How can the JELF be improved to optimize capacity building at your institution? For example:
    - How does your institution identify and select the candidates for the JELF? Do you have a specific strategy and policy on the use of JELF? Is it used for both attraction and retention purposes, or primarily for one or the other?
    - How do the needs associated with attracting and retaining candidates differ?
    - Is the ratio of attraction and retention candidates appropriate? What proportion of new faculty at your institution are JELF candidates? Is there a strong rationale for the CFI to shift the focus back to attraction? Why?
    - Given that the JELF is meant to support a select number of an institution's most excellent new researchers, should the proportion of JELF awards going to attraction candidates that do not hold Tri-Council funding be a concern? Is this trend worsening?
- Given the concerns noted above, the CFI is giving serious consideration to setting the minimum CFI request at $50,000 or $60,000. This would represent projects with total costs of between $125,000 and $150,000, while recognizing there would be a few exceptional cases (e.g. in the social sciences and humanities). How would institutions view the introduction of a CFI minimum request?
- Should we also consider raising the CFI maximum request (e.g. from $800,000 to $1 million)?
- The Small Institution Fund (SIF) mechanism was created to optimize the use of the JELF allocations for smaller institutions. Are there any modifications to the SIF that should be considered?

INNOVATION FUND (IF)

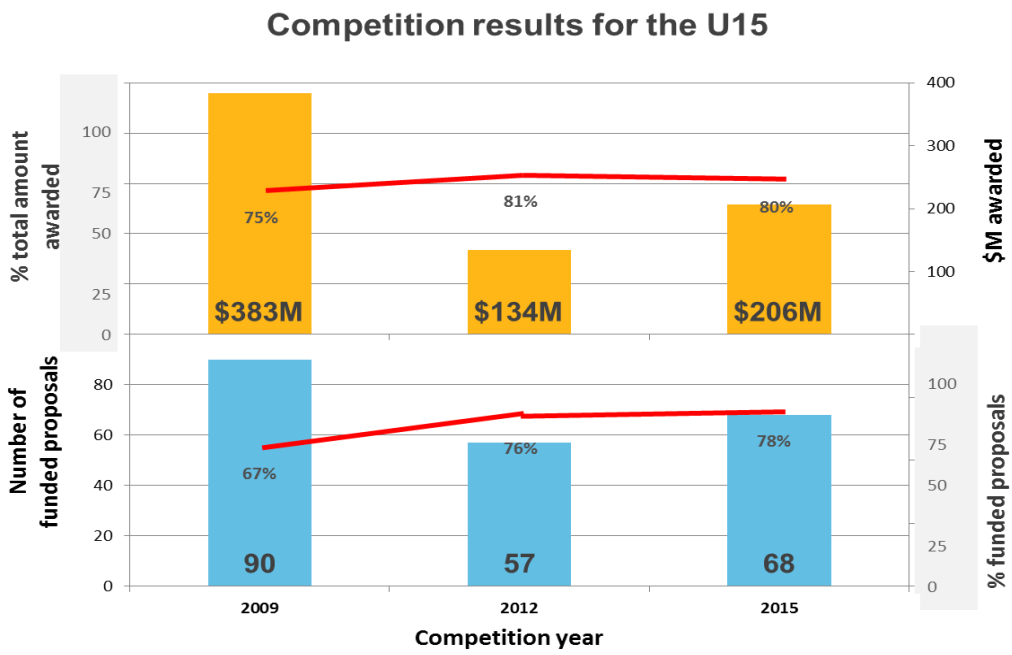
The Innovation Fund, the CFI's flagship fund, enables institutions to propose transformative infrastructure projects that will underpin cutting-edge research and will have a structuring effect on Canada's research landscape. The Innovation Fund challenges institutions to make strategic choices and set priorities that build on their distinct advantages. The 2015 competition was the ninth national competition held by the CFI since the inaugural October 1998 competition, with a CFI investment of approximately 3 billion dollars in support of transformative infrastructure projects across all disciplines and areas of research.

The next Innovation Fund competition will have a total budget of approximately $552 million ($425 million capital + $127 million of generated IOF), significantly larger than the previous two competitions. Overall, feedback on the 2015 Innovation Fund suggests that the process worked well and was appreciated by the research community. The CFI considers it important that this flagship funding mechanism remain stable over time to allow institutions to properly plan and develop competitive projects.

Some observations

The results of the 2015 competition, however, raised a few questions that merit further discussion. In particular, it is worth reflecting on questions related to the low participation and success rate of small institutions and institutions in Atlantic Canada, which seems to be a consistent trend over the last three competitions.

- Large universities (those that receive more than one percent of the total funding from the federal granting agencies) continue to represent the largest share of proposals submitted (85 percent), proposals funded (94 percent) and funding received (97 percent). The overall success rate for large universities is 34 percent. The U15 universities — a group of 15 of Canada's most research-intensive universities — received a significant proportion of the competition funding ($206 million, or roughly 80 percent, in the most recent competition).



- Smaller institutions (with less than one percent of total funding from the federal granting agencies), on the other hand, have seen their share of proposals submitted decrease from 18 percent in the 2012 competition to 13 percent in 2015; proposals funded from 9 percent to 5 percent; and funding received from 6 percent to 3.4 percent. Their overall success rate was 11 percent in 2015, down from 16 percent in 2012. Moreover, of the nine small institutions that received funding, five were involved in multi-institutional projects.
- Over the last two competitions, the number of proposals submitted by institutions in Atlantic Canada was very small: nine in 2012 and 13 in 2015. While none of these proposals received funding, one Atlantic institution will receive CFI funding as a collaborating institution in another project.
- In the 2015 competition, of the 305 submitted proposals:
    - 13 proposals had total projects cost of less than $1 million, resulting in a request to CFI of $400,000 or less, including one in the social sciences and humanities. Ultimately, two proposals were funded.
    - 50 proposals had total project costs below $2 million, with a request to CFI of $800,000 or less; 16 of these were funded.

Some key questions related to the Innovation Fund

Portfolio of funded projects

- Do you believe the Innovation Fund in its current form enables the CFI to support the full spectrum of research initiatives: from discovery to technology development; from institutional facilities to national facilities; from Canadian to international and global initiatives? If not, what types of initiatives are not being adequately addressed by the Innovation Fund?
- Large universities and research hospitals have received the bulk of funding for the last three competitions. Success and funding rates for smaller institutions have continued to decrease over the past two competitions.
    - How can the Innovation Fund best serve the strategic research objectives of smaller institutions?
    - Should smaller institutions make more effective use of their partnering assets in areas of national and global research strengths? If so, how can the CFI further encourage partnering with other institutions, both large and small?
    - Should the CFI consider increasing the Innovation Fund application envelopes for smaller institutions to help them define more ambitious projects that are well aligned with their core areas of expertise? Or should we focus instead on increasing the JELF allocations for small institutions? What other actions or solutions could be considered?

Application and review process

- **Proposal length:** Feedback from applicants and reviewers alike indicates that the CFI should consider eliminating those elements of the proposals that are not critical to the review process.
    - Which elements of the proposal do you consider to be critical, and which are not?
    - What are the potential impacts, positive and negative, of shortening the proposals (e.g. from 40 pages to 25 or 30 pages)?
- **Streamlined CVs:** Another possible way to streamline proposals would be to reduce the amount of information provided in participants' CVs to include only key elements (e.g. expertise and track record). Currently, the CFI CVs (either imported from the CCV or completed on the CFI website) include the following sections: identification, academic background, area of expertise, work experience, recent research contributions, list of published contributions, research funding.

  - Should the CFI explore options to reduce the current CV requirements?
  - Should it limit the CV requirements to those found in the CCV, and move any other CV requirements to the body of the proposal?
  - Are these changes likely to increase the workload of applicants or have other impacts?
- Given CFI's ongoing concerns about application, review and administrative burden, should the minimum Innovation Fund request to CFI be raised from $200,000 to $400,000?
- **Usefulness of the Strategic Research Plan (SRP) in the merit review process:** see below under "**OTHER SRATEGIC ISSUES**"

CYBERINFRASTRUCTURE INITIATIVE

It is early days for the CFI's new Cyberinfrastructure Initiative. Launched in late 2014, the Initiative proposed two separate but interrelated challenges, where the CFI would invest in:

- A limited number of research data infrastructure projects that, in collaboration with Compute Canada, enable communities of researchers, along with data scientists, data analysts, software developers and other experts to devise optimal ways of organizing and using research data resources (Challenge 1: research data infrastructures); and,
- Upgrading and modernizing the computational and data storage capacities of the pan-Canadian advanced research computing platform, managed by Compute Canada (Challenge 2: shared advanced research computing infrastructure).

So far, the CFI has made a first investment of $30 million under Challenge 2 to address the most urgent and pressing computational and data storage needs of the pan-Canadian advanced research computing platform. The CFI also received 37 Notices of Intent under Challenge 1. Of these, 18 have been invited to submit a full proposal. Funding decisions on these proposals will be made in March 2016.

Although it may be too early to make any significant adjustments or improvements, we would, nevertheless, like to receive your feedback regarding the launch of the Cyberinfrastructure Initiative, and any suggestions you may have for adjustments or improvements. This feedback will be particularly useful for the CFI to determine the best use of the funds allocated to cyberinfrastructure in the 2015 Federal Budget. More specifically:

Under Challenge 1 (research data infrastructure):

- Do you know if there is sufficient interest to hold additional competitions beyond the first two that have been announced? On what basis would you assess the level of interest?
- Should the CFI consider increasing future competition budgets (currently set at approximately $10 million each)? If so, what would be an appropriate amount?
- Should the CFI consider increasing the maximum request (currently set at $2 million), knowing that larger projects will require longer timelines to be commissioned? If so, what would be an appropriate amount?

Under Challenge 2 (shared advanced research computing infrastructure):

The CFI has maintained its objective and commitment to maximize the effective and efficient sharing of advanced research computing infrastructure. This was the key driver for modernizing and upgrading the pan-Canadian advanced research computing platform managed by Compute Canada. Furthermore, funded projects under the Innovation Fund and JELF requesting significant research computing infrastructure are required by CFI to provide sufficient information to enable Compute Canada to

determine which of its facilities is best suited to house and manage the research computing infrastructure (commonly referred to as the "Compute Canada condition").

Compute Canada provides support to researchers, teams and consortia that have significant resource requirements. CFI considers institutions to be responsible for providing support to individual researchers and teams with modest computational requirements. It is not clear where the threshold between the two lies. This sometimes creates inefficiencies by having users who should be supported by their institution being served by Compute Canada and vice versa.

- Recognizing that the capacity to support individual researchers and teams varies from institution to institution, should this threshold be more clearly defined? If so, how?
- While we plan to maintain our approach to maximizing the sharing of computational resources, should the CFI adjust its approach for smaller awards made under the JELF requesting computing infrastructure (e.g. definition of research computing infrastructure, requirements to consult with Compute Canada)?

COLLEGE-INDUSTRY INNOVATION FUND (CIIF)

The College-Industry Innovation Fund was first launched in 2010 to enhance the capacity of colleges to support business innovation in Canada by fostering partnerships with the private sector. The CFI continues to monitor interest in the College-Industry Innovation Fund with some concern. Proposals submitted under both Stream 1 (CFI alone) and Stream 2 (joint application to CFI and the Tri-Council College Community Innovation Program-Innovation Enhancement) competitions are fewer than expected. Institutions and stakeholder organizations (such as Colleges and Institutes Canada, Polytechnics Canada, Association pour la recherche au collégial) state that the low take-up rate is explained by a combination of limited, but increasing, institutional administrative capacity and the expansion of funding opportunities over the past five years.

In response to targeted consultations last year, the CFI has indicated that, starting with the 2016 competition, proposal requirements will be streamlined and shortened. This will reduce application burden.

- Do you have suggestions or ideas on how to increase participation in the CIIF, particularly under Stream 2 where approximately half of all proposals are submitted without a CFI component?
- Within the limits of its mandate, how can the CFI help colleges build the research capacity necessary to fully capitalize on the CIIF?

Since 2012, the CFI has noticed the clustering of awards in a few specific applied research domains including advanced manufacturing, green construction and buildings, environmental technologies and clean energy.

- Are there opportunities to leverage the institutional capabilities in these "clusters," for example, by encouraging the development of communities of practice and networks?

INFRASTRUCTURE OPERATING FUND (IOF)

The Infrastructure Operating Fund (IOF) helps cover a portion of the operating and maintenance (O&M) costs of CFI-funded infrastructure to ensure optimal use. All eligible projects generate an IOF allocation of 30 percent of the maximum CFI amount approved at award finalization. Each institution is responsible for deciding how their funds will be divided among projects eligible to receive IOF. Institutions can distribute their IOF allocation based on actual operating and maintenance requirements as opposed to allocating

the exact amount to the project that generated it. This offers institutions maximum flexibility to support projects with different needs and scope, while ensuring accountability.

The IOF continues to be well-utilized, and a growing number of institutions are allocating these funds in a strategic manner, either by holding annual internal allocation processes and/or competitions based on actual O&M needs of projects, or by creating a centralized fund to address urgent and emerging O&M needs as a rapid response mechanism.

Some observations

As of June 2015, institutions had access to a total of $1.1 billion under the IOF, of which some $780 million has been paid by the CFI. This represents an IOF take-up rate of 71 percent, a substantial increase from the 61 percent take-up rate at June 2013. The take-up rate in 2011 was 44 percent. This trend clearly indicates that a large number of CFI-funded projects are now fully operational and making full use of the IOF. In addition, the CFI has noted that more institutions are taking advantage of the change in policy regarding use of IOF, previously limited to a five-year window, in favor of the CFI's more flexible "useful life" guideline for research infrastructure.

While the CFI is not proposing changes to the IOF guidelines at this time, we would be pleased to hear any feedback or suggestions about the design or delivery of this fund.

OTHER STRATEGIC ISSUES

CFI's funding architecture: Keeping in mind the stated objectives and expected results and amounts allocated to each of our funding mechanisms (pp. 1 and 2) of this document, the CFI has always endeavored to design, develop and deliver a suite of funds that:

1. Responds to the needs of the Canadian research community;
2. Serves the full spectrum of institutions across the country;
3. Is based on a clear and simple architecture to avoid redundancy and overlap; and
4. Optimizes collaboration and integration with other Tri-Council funding programs.

Some of the questions posed above seek your input on whether individual CFI funds meet these four objectives. With an expanded mandate that has enabled the CFI to address – the operating and maintenance needs of national research facilities, the business innovation needs of the private sector through partnerships with colleges, polytechnics and cégeps, and the development of shared advanced research computing infrastructure and research data infrastructures – our funding architecture is now more diversified. As a result, some of our new funding mechanisms target smaller subsets of institutions and their researchers eligible to apply for CFI funding.

The CFI has a number of existing collaborations with the three Federal granting agencies (JELF partnerships with CRC, CERC, NSERC and SSHRC; the CIIF Stream 2 competition; and the MSI Fund integrated review and reporting framework). Within the framework of our agreement with the Government of Canada, we continue to explore opportunities for greater collaboration and integration.

In this context:

- Do you believe the CFI's suite of funds meet objectives 1 to 4 above?
- Are there any gaps in our funding architecture? If so, what are they and how could the CFI best address them?

- With the launch of new funding mechanisms (most recently the Cyberinfrastructure Initiative and the Canada First Research Excellence Fund), what aspects should we consider to maximize the impact and effectiveness of CFI funding?

Strategic Research Plans (SRP): SRPs have now been in place for almost 20 years and are widely recognized as having had a transformative impact on the Canadian research landscape since the concept was first introduced. The development of SRPs is required for both CFI and Canada Research Chairs proposals. The CFI is proud of the lasting impact its requirement of developing SRPs has had on the Canadian research enterprise. However, over the past five years a growing number of reviewers have expressed concerns about the diminishing value of the SRPs in their assessment work.

Expert Committee and Multidisciplinary Assessment Committee (MAC) members often noted that the SRPs are not particularly useful because many are overly general and broad, lacking the specific details essential for review of Innovation Fund proposals. For example, only 20 percent of 2015 MAC members thought SRPs were "very useful," 40 percent found they were "somewhat useful" and the remaining 40 percent rated them as "slightly useful (30 per cent)" or "not at all useful (10 per cent)." While the CFI views SRPs as an important tool and is not questioning their continued need, and given that proposals already include details about institutional capacity and contributions in the project domain:

- How can SRPs be used more effectively in the merit review process?
- Should "fit with the SRP" be addressed solely within the body of the proposal?

Facilities developed to maximize the use of research infrastructure:

a. **Regional facilities:** The Major Science Initiatives Fund was designed to address the operational needs of national research facilities so that they may fully exploit their scientific capabilities. The first two MSI Fund competitions identified a select number of facilities that demonstrated significant operational needs beyond what any single institution could provide, although these did not meet the criteria of national research facilities. These are best described as regional facilities.
b. **Institutional core facilities:** Over the past two years, the CFI has examined and interacted with a number of institutional and stakeholder organizations involved in the management and operations of core facilities. These facilities are a growing trend in Canadian institutions, largely in response to maximizing efficient and effective use and operation of research infrastructure through consolidation and optimization, and the resulting economies of scale. Core facilities nevertheless face challenges in sustainability, relying heavily on user fees, the IOF and other sources of operational funding, typically from the institution itself.

Given that these types of facilities are aligned with the CFI's objective of maximizing the efficient and effective use of research infrastructure, and that a growing number of Canadian institutions are on the path of an emerging trend of consolidation and integration of their research infrastructure assets (some by design from strategy, some by opportunity from economies of scale and some by crisis from lack of sustainability):

- What is the role of institutions in ensuring the sustainability of these types of facilities?
- If these facilities indeed maximize the efficient and effective use and operation of research infrastructure, why do they continue to experience sustainability challenges?
- Does the IOF, described in the previous section, provide sufficient flexibility to address needs of these facilities?
- Is there a further role for the CFI to support these facilities beyond the IOF?

IN CONCLUSION

We trust the consultation paper will provide you with much to think about and will help stimulate discussion amongst your colleagues and partners. We look forward to meeting and engaging with many of you over the next few months and listening to your ideas, suggestions and advice. Your invaluable feedback and input enables the CFI to continue to design and deliver funding mechanisms that are well-aligned and responsive to the needs and priorities of the Canadian research community. Thank you in advance for your continued interest and collaboration, and your participation in the upcoming consultation.

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