VALUE-FOR-MONEY AUDIT OF THE CANADA FOUNDATION FOR INNOVATION

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ACRONYMS

APCF	Automotive Partnership Canada Fund
BBMD	Bell Browne Molnar & Delicate Consulting Inc.
CAMS	CFI Award Management System
CAST	Contribution Audit Selection Tool
CFI, the	The Canada Foundation for Innovation
CIHR	Canadian Institutes of Health Research
CIIF	College-Industry Innovation Fund
CLS	Canadian Light Source
FA	2010 Funding Agreement
HQP	Highly qualified personnel
IOF	Infrastructure Operating Fund
JELF/LOF	John R. Evans Leaders Fund (Leaders Opportunity Fund)
LEF/NIF	Leading Edge Fund/New Initiatives Fund
MAC	Multi Disciplinary Assessment Committee
MSI	Major Science Initiatives
NSERC	Natural Sciences and Engineering Research Council of Canada
O & M	Operating and maintenance
OMS	Outcome Measurement Study
OPE	Overall Performance Evaluation
PERAF	Performance, Evaluation, Risk and Audit Framework
POMS	Platform Outcome Measurement Study
PPR	Project Progress Report
R&D	Research and development
RHF	Research Hospital Fund
S-MAC	Special Multi Disciplinary Assessment Committee
SEIA	Socio-Economic Impact Assessment
SNOLAB	Sudbury Neutrino Observatory laboratory
SPO	Senior Programs Officer
SRP	Strategic Research Plan
SSHRC	Social Sciences and Humanities Research Council
TRAAM	Tool for Risk Assessment and Management
VFMA	Value-for-Money Audit

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EXECUTIVE SUMMARY

BACKGROUND

The Canada Foundation for Innovation (CFI) was created in 1997 for the purpose of making research infrastructure grants to strengthen the capacity of Canadian universities, colleges, research hospitals, and non-profit research institutions to carry out world-class research and technology development. Of the $5.490 billion in funding the CFI has received from the Government of Canada, $1.250 billion was provided between 2009 and 2013.

The CFI funds priority research infrastructure needs identified by eligible institutions across all research disciplines, as well as across a wide range of types of infrastructure. Up to 40% of the capital costs of these projects were funded by the CFI; the balance came from partners, such as provincial governments, recipient institutions and private sector partners.

The 2010 Funding Agreement (FA) included an expectation that the funding of research infrastructure would enhance the capacity of Ultimate Recipients to:

(a) attract and retain the world's top research talent;
(b) enable researchers to undertake world-class research and technology development that lead to social, economic and environmental benefits for Canada;
(c) support private sector innovation and commercialization; and,
(d) train the next generation of researchers.

AUDIT MANDATE, OBJECTIVES and SCOPE

This Value-for-Money Audit (VFMA) fulfills the requirement in the FA that the CFI carry out a performance (value-for-money) audit at least once every five years to ensure the economy, efficiency and effectiveness with which funds have been used. The CFI's Request for Proposal further clarified that the VFMA was to take a risk-based approach, taking into consideration the key risks facing the achievement of the CFI's Expected Results.

The objective of this Value-for-Money Audit is to provide an independent assessment of the CFI's operations to ensure the economy, efficiency and effectiveness of the funds used in the achievement of the Expected Results under the FA.

Therefore, the overall objectives used to group the Audit Criteria were established as:

Objective 1: Key Corporate activities effectively support the achievement of the CFI Expected Results

Objective 2: Processes for project selection and oversight contribute to the CFI Expected Results

The audit was conducted concurrently with the Overall Performance Evaluation (OPE), also a requirement of the FA. The audit examined activities from 2009 forward through document review, interviews and surveys, and file testing of project selection and project monitoring.

FINDINGS AND CONCLUSIONS

While the achievement of the Expected Results is based on the ultimate success of the projects undertaken by recipients, the strength of the CFI operations at the corporate level and at the program level greatly impact the overall achievement of the Expected Results.

The CFI has a clear understanding of the Expected Results in the FA. The CFI uses a risk-based approach to plan and manage activities to achieve the Expected Results. The CFI undertakes formal risk assessments periodically and uses ongoing informal monitoring to assess risk levels and the effectiveness of mitigation.

The CFI has a formal performance measurement plan. However, the plan needs to be updated to address all the elements of the Expected Results. The CFI has mechanisms to gather and analyze performance measurement information across all projects on the impact of the funded research infrastructure. The CFI also undertakes in-depth studies to further explore the impact of major projects and specific research themes. The CFI could further demonstrate the impact of funding by reporting summary information on the overall achievement against the Expected Results in its Annual Report.

Enhancing research at Canadian institutions requires a combination of talented researchers, research funding and infrastructure. In order for the CFI to effectively perform its role in supporting the acquisition and maintenance of infrastructure, it must have a clear understanding of the needs, preferences and challenges of other stakeholders in the research eco-system. The CFI is well recognized for its efforts in the area of Stakeholder Engagement. Stakeholders expressed their appreciation for the level of engagement and willingness of the CFI to make adjustments, where appropriate, in response to stakeholder feedback. Responsibility for stakeholder engagement is distributed throughout the organization with each unit having formal responsibilities to engage with their peers in recipient institutions and other funding organizations. The CFI has mechanisms to efficiently share the gathered intelligence within the organization.

The merit review process used by the CFI in project selection is robust and highly valued by the research community and other funders. It effectively aligns the portfolio of projects selected with the Expected Results of the FA.

The CFI's approach to project monitoring works in partnership with recipient institutions that also have a vested interest in infrastructure being acquired on time and on budget. The CFI risk-based approach to project monitoring is designed to balance effective oversight with reducing the burden of oversight and reporting where appropriate.

The CFI demonstrated economy in the use of funds to fulfill its mandate. The CFI is a lean organization that provides robust and well-rounded operations while maintaining internal operating costs at a low percentage of the expenditures on infrastructure awards. Likewise, the expert panel review conducted for project selection includes scrutiny of the proposed infrastructure to ensure all components are necessary and proposed costs are reasonable.

The CFI promoted effective use of funds by ongoing efforts in stakeholder engagement to understand the evolving research environment. The merit review process for project selection puts a high emphasis on research excellence. The selected projects often had multiple impacts toward the Expected Results. The CFI gathered and analyzed data from all the funded projects to demonstrate that the infrastructure has indeed resulted in the intended impacts.

The CFI demonstrated efficiency by continually reviewing its processes in all areas. Risks were identified and assessed in order to determine whether current mitigation measures were effective and where further mitigation was needed. The project selection process involved the institutions in making strategic selection of projects for submission. Institutional capacity for project oversight was assessed and utilized to lever the common interest of CFI and the institution to complete projects on time and on budget.

Overall, the CFI is a robust and mature organization that seeks continual improvement in order to deliver on its mandate while being mindful of economy, effectiveness and efficiency.

RECOMMENDATIONS

The following recommendations are made for incremental improvements to CFI operations:

Recommendation 1: *In developing its next Performance, Evaluation, Risk and Audit Framework (PERAF), the CFI should ensure all aspects of the Expected Results from its funding agreements are included in the logic model, performance measurement framework and evaluation framework.*

Management response: The CFI is required to refresh its PERAF by March 31, 2015, to ensure alignment with the 2014 Contribution Agreement. Both aspects of this recommendation were carefully considered for the update.

The CFI operates under two active funding agreements and one contribution agreement:

- the 1997 (Amended) Funding Agreement, which includes four "national objectives;"
- the 2010 Funding Agreement, which includes four "expected results; " and
- the 2014 contribution agreement which includes slightly modified versions of the national objectives and expected results.

The "national objectives" are the objectives established by the Government of Canada that are to be achieved by the CFI, while the "expected results" are the results intended to be achieved by the recipients of CFI funding. These objectives and results are closely aligned and are interdependent.

To avoid overlap and repetition, not all of the national objectives and expected results were explicitly listed in the CFI logic model. Instead, we determined that it was much clearer to have some captured through more broad outcome and impact statements. As an organization, we are confident that all objectives and results are represented within the revised logic model. The CFI routinely collects data related to objectives, expected results as well as our strategic priorities.

Recommendation 2: *The CFI should ensure the Tool for Risk Assessment and Management (TRAAM) is being used effectively to document project and institutional risk assessment and to plan and follow up on oversight measures.*

Management response: The TRAAM was introduced in 2013 and one of the challenges identified during the design stage was in fact the variation between the assessments and notations included by the different people that complete the TRAAM. This is expected when numerous people are involved in using a tool. Since its implementation, the Programs and Finance teams have been meeting periodically to review the assessments made and discuss the level of documentation included in the TRAAM. This recommendation will be actioned upon.

Recommendation 3: *The CFI should ensure that all reporting requirements are clearly identified in the Award Agreement.*

Management response: The CFI is currently in the process of reviewing its Award Agreement template and will incorporate all known reporting requirements at the award finalization stage. Since the CFI uses a risk-based management approach, these requirements may change over time if there are changes in project risks.

1. BACKGROUND

1.1 About the Canada Foundation for Innovation

The Canada Foundation for Innovation (CFI) was created in 1997 for the purpose of making research infrastructure grants to strengthen the capacity of Canadian universities, colleges, research hospitals, and non-profit research institutions to carry out world-class research and technology development. Initial funding allocated to the CFI in 1997 was $800 million; a further $4.690 billion was allocated in subsequent federal budgets. Of the grand total of $5.490 billion, $1.250 billion was provided between 2009 and 2013.

The CFI funds priority research infrastructure needs identified by eligible institutions across all research disciplines, as well as across a wide range of types of infrastructure. Only eligible institutions, and not individual researchers, can submit proposals to the CFI. Selection of proposals was through merit-based review processes (which vary depending upon the specific fund). Proposed infrastructure projects were linked to research identified by eligible institutions as priorities in each institution's summary Strategic Research Plan. Up to 40% of the capital costs of a project are funded by the CFI; the balance comes from partners, such as provincial governments, recipient institutions and private sector partners.

As an independent foundation, the CFI is able to fund multi-year capital investments in research facilities and equipment independently of the government's annual appropriation cycle.

Between 2009-10 and 2012-13 the CFI had six funding mechanisms actively committing to new projects (Appendix A), three of which were introduced in 2009-10 or 2010-11.

Four of these Funds provided capital for infrastructure:

- ***Leading Edge Fund/New Initiatives Fund (LEF/NIF)*** – invests in innovative infrastructure projects that sustain and enhance areas of activity in which the CFI has already invested and provide support to explore promising new research directions;
- ***John R. Evans Leaders Fund*** (previously the ***Leaders Opportunity Fund) (LOF/JELF)*** – helps universities attract and retain world-class researchers by funding infrastructure to enable cutting edge research;
- ***College-Industry Innovation Fund (CIIF)*** – funds state-of-the-art, industry-relevant research infrastructure to foster partnerships between colleges and the private sector (Introduced in 2010-11); and
- ***Automotive Partnership Canada Fund (APCF)*** – funds research infrastructure in support of collaborative Research and Development (R&D) activities intended to benefit the Canadian automotive industry under the umbrella of the Natural Sciences and Engineering Research Council of Canada (NSERC)-led Automotive Partnership Canada (Introduced in 2009-10).

Two other Funds provided funds for operating and maintenance (O & M) of research infrastructure:

- ***Infrastructure Operating Fund (IOF)*** – funds a portion of the operating and maintenance costs of the CFI-funded infrastructure; and
- ***Major Science Initiatives (MSI)*** – contributes to the operating and maintenance costs of CFI-funded large-scale research facilities (Introduced in 2010-11).

In this same timeframe, the CFI was also managing fund distributions based on progress of projects previously committed under eight other funding mechanisms (Appendix B). The majority of the funds disbursed from these other funding mechanisms were under:

- ***Innovation Fund*** – enables eligible institutions, either alone or in a group, to strengthen their research infrastructure in priority areas as identified in their strategic research development plan. The fund promotes multidisciplinary and inter-institutional approaches, and enables Canadian researchers to tackle groundbreaking projects;
- ***International Fund –*** supports Canadian institutions to lead and participate in major multi-national research projects;
- ***National Platforms Fund –*** contributes to research infrastructure, resources and services that take a Pan-Canadian approach to meet the needs of many research areas and are supported by multiple partners and agencies. To date, projects in high performance computing and knowledge management infrastructure have received funding; and,
- ***Research Hospital Fund (RHF) –*** contributes to large-scale, hospital-based research initiatives in which space is a key feature, either through Large Scale Institutional Endeavours or Regional/National Clinical Research Initiatives.

1.2 Expected Results

The Expected Results for the CFI, as defined in the funding agreements between the CFI and the federal government, have evolved since 1997, to clarify and focus the mission of the CFI.

The following is an extract of the 2010 Funding Agreement:

> **2.3 Expected Results.** The Foundation covenants and agrees to complete the Activities in accordance with the terms and conditions of this Agreement. The Minister anticipates that the Foundation will ensure that the following expected result will occur from the Up-front Multi-year Funding and success in achieving these results will be evaluated:
>
> • Enhance the capacity of Ultimate Recipients to:
>
> (a) attract and retain the world's top research talent;
> (b) enable researchers to undertake world-class research and technology development that lead to social, economic and environmental benefits for Canada;
> (c) support private sector innovation and commercialization; and,
> (d) train the next generation of researchers.

1.3 Requirement for the Value-for-Money Audit

This Value-for-Money Audit (VFMA) fulfills a requirement in the FA that the CFI carry out a performance (value-for-money) audit at least once every five years to ensure the economy, efficiency and effectiveness with which funds have been used. The CFI's Request for Proposal further clarified the VFMA was to take a risk-based approach, taking into consideration the key risks facing the achievement of the CFI's Expected Results.

2. OBJECTIVES, SCOPE and APPROACH

2.1 Objectives

The objective of this Value-for-Money Audit is to provide an independent assessment of the CFI's operations to ensure the economy, efficiency and effectiveness of the funds used in the achievement of the Expected Results under the FA.

In considering the activities and processes that have been put in place to achieve the Expected Results, a natural delineation emerged between those that operate at the CFI corporate level and those that are applied at the recipient/project level.

Therefore, the overall objectives used to group the Audit Criteria were established as:

> ***Objective 1: Key Corporate activities effectively support the achievement of the CFI Expected Results***
>
> ***Objective 2: Processes for project selection and oversight contribute to the CFI Expected Results***

These objectives recognize that while the achievement of the Expected Results is based on the ultimate success of the projects undertaken by recipients, the strength of the CFI operations at the program level and at the corporate level will greatly impact the overall achievement of the Expected Results.

2.2 Audit Criteria and Subcriteria

The audit criteria were identified through a risk-based approach. Risks were identified through a review of the 2012 Risk Assessment undertaken by the CFI management. These risks were confirmed as still current through interviews with management in the planning stage of the VFMA. Audit activities were already planned for certain risk areas (human resources management, major science initiatives (MSI)) so these efforts were not duplicated in this audit. In addition to the risks identified by management, an examination of the CFI risk-based management approach was included in the audit scope.

Table 1: Audit Objectives, Audit Criteria and Subcriteria

Audit Objective 1: Key Corporate activities effectively support the achievement of the CFI Expected Results	
Audit Criteria	**Subcriteria**
1.1 Risk-based management is used at the Corporate level in support of Expected Results	• 1.1.1 The CFI has clear Expected Results • 1.1.2 The CFI has identified and assessed risks to reaching Expected Results and identified and implemented mitigation measures • 1.1.3 The CFI monitors risk levels and effectiveness of mitigation
1.2 Performance measurement design and implementation support reporting of progress on Expected Results	• 1.2.1 Design of project performance measurement is linked to Expected Results • 1.2.2 Actual project performance information gathered is linked to Expected Results • 1.2.3 The CFI measures impact of activities over and above those captured in the Project Progress Reports • 1.2.4 The CFI undertakes continuous improvement in performance measurement and reporting
1.3 The CFI undertakes effective Stakeholder Engagement	• 1.3.1 The CFI identifies and actively engages with stakeholders (individually and collectively): o to understand their objectives, needs, resources o to communicate the CFI mandate, objectives, capabilities and programs • 1.3.2 The CFI has timely knowledge of stakeholder interests and uses this information in program design • 1.3.3 The CFI communicates research community needs and successes

Audit Objective 2: Processes for project selection and oversight contribute to the CFI Expected Results	
Audit Criteria	**Sub criteria**
2.1 Processes to assess and select projects are effective in aligning funding decisions with the potential to generate Expected Results	• 2.1.1 Clear roles and responsibilities are established and communicated for each stage of project selection process • 2.1.2 Application requirements are aligned with Funding Agreement requirements and include information related to each Expected Results • 2.1.3 Selection process clearly documents that: o Selection criteria respects requirements in funding agreement (eligible recipient, eligible expenditures, allocation of funding) o Rationale for funding decisions are aligned with the objectives of the Fund (Funds align with Expected Results)
2.2 Project oversight reflects risks	• 2.2.1 Project oversight is designed to: o Identify key risks o Monitor risk levels and effectiveness of mitigation • 2.2.2 The CFI's risk rating of project is updated regularly and discussed with the institution to get its perspective of project risk • 2.2.3 Project monitoring is consistent with risk ranking • 2.2.4 Insights from monitoring inform risk rating of project/institution/ risk-based approach

2.3 Scope

To a large extent, the scope of the current VFMA began at the point where the scope of the previous VFMA was completed in 2009.

Audit activities related to project selection examined recent funding rounds for the following funds (including the related Infrastructure Operating Fund awards):

Leading Edge Fund/New Initiatives Fund (2012/13)
John R. Evans Leaders Fund (2010, 2011 and 2012)
College-Industry Innovation Fund (2011, 2012)
Major Science Initiatives (testing was covered in concurrent Internal Audit)

Audit activities that related to project oversight and reporting examined projects from previous funding rounds that are still active in funding distribution and reporting:

Leading Edge Fund/New Initiatives Fund (2009/10)
John R. Evans Leaders Fund
Research Hospital Fund
College-Industry Innovation Fund
Major Science Initiatives (testing was covered in concurrent Internal Audit)
Infrastructure Operating Fund

Overall, the audit examined corporate and program-related activities up until March 31, 2014.

2.4 Approach

The audit was conducted concurrently with the Overall Performance Evaluation (OPE), also a requirement of the FA.

The conduct of the OPE and VFMA included:

- Interviews:
    - Canada Foundation for Innovation – 12 interviews with CFI Board Directors (current and previous), CFI President and Vice-Presidents and CFI Directors;
    - Institutions – 28 interviews with Presidents, Vice-Presidents of Research, and heads of Industrial Liaison Offices at 17 universities, 2 research institutions and 3 colleges;
    - Provinces – 8 interviews with representatives from 8 provinces;
    - Federal funding agencies – 4 interviews with NSERC, Social Sciences and Humanities Research Council (SSHRC), Canadian Institutes of Health Research (CIHR) and Genome Canada;
    - Government of Canada – 2 interviews with Industry Canada; and
    - Private sector and other end users – 8 interviews
- Survey responses from 1,470 Project Leaders and Principal Users
- Analysis of Project Progress Reports and Administrative data from approximately 2,600 projects
- Examination and analysis of:
    - Corporate documents;
    - Meta-analysis of Outcome Measurement Studies (OMS) and other studies;
    - Documentation supporting project selection, project oversight, stakeholder engagement and performance measurement activities;

- A sample of 31 project files to review the project selection process and 28 project files to review the monitoring performed; and
- Results of previous compliance audits, contribution audits, internal and external audits, reviews, studies and evaluations

The audit considered activities of the CFI up to March 31, 2014 and the audit fieldwork concluded on July 4, 2014.

The work was limited to, and conclusions are based on, the audit procedures conducted, and the observations and conclusions should be considered in the context of the procedures performed.

3. FINDINGS, RECOMMENDATIONS and MANAGEMENT RESPONSE

3.1 Key corporate activities effectively support the achievement of the Expected Results

3.1.1 Corporate level Risk Management

Audit Criteria: Risk-based management is used at the Corporate level in support of the CFI Expected Results

3.1.1.1 Audit Subcriteria: The CFI has clear Expected Results

Conclusion: The CFI has a clear understanding of the Expected Results as defined in the 2010 Funding Agreement.

Risk-based management starts with a clear understanding of the intended objectives and outcomes as a basis to identify and evaluate the risks to achieving these results.

The FA set out the expectation that research infrastructure will enhance the capacity of recipient institutions in four key areas (Section 1.2 Expected Result) but the FA did not define "success" or set targets for achievement of these outcomes.

In interviews, the CFI management demonstrated a clear and consistent understanding of the four key areas and that a combination of research talent, research funding and infrastructure is necessary for recipient institutions to develop enhanced capacity in these areas. The CFI considers their role in the achievement of the Expected Results to be: the design of Funds and competitions within the Funds that address the four key areas; and the selection of projects that have the greatest potential to realize the Expected Results.

3.1.1.2 Audit Subcriteria: The CFI has identified and assessed risks to reaching Expected Results and identified and implemented mitigation measures

Conclusion: The CFI undertook a formal risk assessment to identify and assess risks.

The CFI undertook a formal risk assessment process in 2010 and in 2012. Documentation from the 2012 risk assessment process showed that the CFI management met to identify risks, rated these risks for likelihood of occurrence and impact, confirmed risk tolerance, and identified existing and planned actions to mitigate risk. In total, seventeen risks were identified. These were grouped into primary and secondary risks to allow the CFI to focus on the most significant risks to the organization and its mandate. The risk assessment process was well documented and showed a complete and thoughtful consideration of the issues and opportunities facing the CFI.

Conclusion: Mitigation measures were identified and implemented.

In the course of the 2012 risk assessment process, mitigation measures were noted related to all seventeen risks identified. The mitigation measures for the seven primary risks, as presented in the 2013-14 CFI Corporate Plan, had been reviewed to refine and identify additional mitigation to those included in the original notes.

While the CFI does not have a formal process to assign responsibilities, set deadlines and track implementation of the mitigation measures, interviews indicated that the identified risks and their mitigation continued to receive management attention between formal risk assessment processes.

3.1.1.3 Audit Subcriteria: The CFI monitored risk levels and effectiveness of mitigation

Conclusion: The CFI monitored risk levels and effectiveness of mitigation.

The Risk-based internal audit plan for 2012-13 to 2014-15 included audits (MSI Projects, Talent Management, CFI Award Management System (CAMS)) to review the CFI processes in selected risk areas identified in the 2012 risk assessment. The audit plan noted that the recently completed 2012 Audit of the Evaluation and Outcome Assessment Function and the 2011-12 Review of Communications addressed several of the primary risks and management is in the process of implementing action plans to respond to the recommendations for improvement that were identified.

The CFI is planning a formal risk assessment process in the Fall of 2014 which will include the consideration of existing and emerging risks and the continued effectiveness of mitigation.

Overall Conclusion: The CFI has a strong risk management culture. Based on a clear understanding of Expected Results, CFI management engages in a formal risk assessment process to identify risks, assess the likelihood, impact, mitigation measures and management tolerance for each risk area. The plan for internal audits and other reviews is linked to the risk assessment process. Management monitors risk levels and mitigation effectiveness between formal risk management exercises.

3.1.2 Performance Measurement

Audit Criteria: Performance measurement design and implementation support reporting of progress on Expected Results

3.1.2.1 Audit Subcriteria: Design of project performance measurement is linked to Expected Results

Conclusion: The Expected Results were not fully represented in the CFI 2011 PERAF.

The CFI logic model, as set out in the 2011 PERAF (Performance, Evaluation, Risk and Audit Framework), identifies the causal or logical relationships between activities, outputs, outcomes,

and the ultimate impacts of the organization. The current CFI logic model has several outcomes that correspond very directly to the Expected Results: high caliber researchers attracted and retained; increased capacity to carry out internationally competitive research and technology development; social and economic benefits to Canada; and high quality research and training environment. The element of the Expected Results related to "enhanced capacity of the Ultimate Recipient to support private sector innovation and commercialization" is not shown as a separate outcome. There is an indirect linkage in that the private sector is considered as partners and end users under the intermediate outcome of "Increased number of productive networks and collaborations" and the long-term outcome of "Increased knowledge and technology transfer". However, neither of these clearly and entirely addresses the expectation for enhanced capacity of the Ultimate Recipient to support private sector innovation and commercialization**.** The addition of an outcome to specifically address "enhanced capacity of the Ultimate Recipient to support private sector innovation and commercialization" would also require additions to the performance measurement framework and the evaluation framework for the new outcome.

Recommendation 1: *In developing its next Performance, Evaluation, Risk and Audit Framework (PERAF), the CFI should ensure all aspects of the Expected Results from its funding agreements are included in the logic model, performance measurement framework and evaluation framework.*

Management response: The CFI is required to refresh its PERAF by March 31, 2015, to ensure alignment with the 2014 Contribution Agreement. Both aspects of this recommendation were carefully considered for the update.

The CFI operates under two active funding agreements and one contribution agreement:

- the 1997 (Amended) Funding Agreement, which includes four "national objectives;"
- the 2010 Funding Agreement, which includes four "expected results; " and
- the 2014 contribution agreement which includes slightly modified versions of the national objectives and expected results.

The "national objectives" are the objectives established by the Government of Canada that are to be achieved by the CFI, while the "expected results" are the results intended to be achieved by the recipients of CFI funding. These objectives and results are closely aligned and are interdependent.

To avoid overlap and repetition, not all of the national objectives and expected results were explicitly listed in the CFI logic model. Instead, we determined that it was much clearer to have some captured through more broad outcome and impact statements. As an organization, we are confident that all objectives and results are represented within the revised logic model. The CFI routinely collects data related to objectives, expected results as well as our strategic priorities.

3.1.2.2 Audit Subcriteria: Actual project performance information gathered is linked to Expected Results

Conclusion: The CFI has a well-developed mechanism to gather performance data at the project level.

The CFI has a well-developed mechanism to gather data for performance measurement at the project level. Project Leaders are required to complete a Project Progress Report (PPR) on the yearly activity of a project over a five-year period. For projects that completed award finalization prior to the end of 2010-11, projects are required to submit reports for each of the five years following award finalization. However, projects that completed award finalization after 2010-11 are required to submit reports starting when the infrastructure became operational for four years when the CFI contribution is less than $1 million and five years when over $1 million.

The reports are submitted electronically which supports developing a data set that could be analyzed across the entire portfolio of projects but also allowed the analysis of a subset of the reports (by province, first year of reporting, area of research, etc).

Limitations of the PPR approach are that some outcomes, particularly benefits, may not be realized until after the five-year reporting period is completed and may be hard to quantify or properly describe in a questionnaire format. The CFI has undertaken Outcome Measurement Studies (OMS), Platform Outcome Measurement Studies (POMS) and the CFI/CIHR joint Socio-Economic Impact Assessment (SEIA) to look in depth at the impact of infrastructure on research themes at specific or multiple institutions. The CFI reviews socio-economic studies (Sudbury Neutrino Observatory laboratory (SNOLAB), Canadian Light Source (CLS), TRIUMF) that demonstrate the outcomes of research undertaken with CFI funded infrastructure.

Conclusion: Relevant project performance information is gathered.

The PPR asked researchers to consider the impact of the infrastructure on various aspects of the research environment and activity at the institution in the last year and where possible, to quantify the impact.

> **Enhance the capacity of Ultimate Recipients to attract and retain the world's top research talent** – The PPR asks the researcher to rate the importance of infrastructure in decisions to change institutions. The OMS gathers an institutional view of the importance of infrastructure in the attraction and retention of researchers.
>
> **Enhance the capacity of Ultimate Recipients to enable researchers to undertake world-class research and technology development that lead to social, economic and environmental benefits for Canada** – Applications for infrastructure funding must demonstrate the superior quality of research that will be undertaken. The PPR does not directly ask about the change in the quality and quantity of research undertaken as a result of the infrastructure. However, this information was gathered in the survey conducted for the OPE.

The PPR asks the extent to which the infrastructure has been a factor in obtaining new Research funding and whether research outputs such as publications and presentations have resulted from the use of the infrastructure.

The PPR asks researchers to identify whether any of a list of benefits has been realized in that year. While the extent of quantification of the benefits is limited, researchers are encouraged to identify success stories for further follow up by the CFI to give context to specific benefits.

Enhance the capacity of Ultimate Recipients to support private sector innovation and commercialization – The PPR asks researchers whether the infrastructure has been used for private sector research collaboration. Indicators for technology transfer such as licensing, and spin-off companies are gathered.

Enhance the capacity of Ultimate Recipients to train the next generation of researchers – The PPR asks researchers to rate the quality of the infrastructure for training. The number of students involved in research projects and the number who use the infrastructure are measured.

Conclusion: The reporting of the PPR data could provide a more fulsome analysis of the progress on Expected Results.

While information concerning various measures relevant to the Expected Results is gathered in the PPR, the CFI does not report this information in a way that is clearly linked to the Expected Results.

The CFI prepares an internal analysis of the PPR data gathered each year. The 2012 PPR analysis shows the direct link of the PPR data on researcher retention. The researcher's opinion of the impact of the infrastructure on training and the number of highly qualified personnel (HQP) using the infrastructure are summarized. The analysis summarizes research outputs such as presentations and publications to disseminate research discoveries and the benefit types, areas of impact and end users.

The 2012 PPR analysis has multiple measures related in part to the private sector. Presenting this data together would provide a more fulsome picture of the impact of the research infrastructure on the private sector through: Highly Qualified Personnel trained on the infrastructure who are now working in the private sector; private sector researchers using research facilities; research collaboration with the private sector; technology transfers through patents and spin-off companies; new jobs created in the private sector, and benefits realized by private sector and industry association partners.

The 2012-13 CFI Annual Report section entitled Results described how the CFI program delivery activity under the Funds aligned with the objectives of: attract and retain the world's top research talent; enable researchers to undertake world-class research and technology development that lead to social, economic and environmental benefits for Canada; and support private sector innovation and commercialization. No information was provided in the Annual Report on the activities that aligned with the objective to train the next generation of researchers. Although the CFI has analyzed the PPR date, the Annual Report did not report the

relevant PPR data to demonstrate whether investments had actually achieved these objectives. Reporting summary data on actual achievement would further demonstrate the impact of the infrastructure funding on research in Canada.

3.1.2.3 Audit Subcriteria: The CFI measures impact of activities over and above those captured in the Project Progress Reports

Conclusion: The CFI has used various methods beyond the PPR to track activities and monitor progress.

The CFI Strategic Roadmap expresses a wider influence by the CFI than the Expected Results. The CFI is developing a Balanced Scorecard to track operating performance indicators for elements of the Strategic Roadmap.

The CFI Research Navigator website provides a searchable inventory of research facilities and capabilities to help match organizations seeking research assistance with appropriate facilities in research institutions. The CFI is using Web analytics to track statistics related to activity on the Navigator website. The CFI also intends to collect anecdotal evidence of the discussions and activities that have resulted from this tool.

OMS, POMS, and Socio Economic Impact studies allow for an in-depth study on outcomes, and a holistic look at themes beyond the information captured in the PPR.

Surveys conducted in the course of Evaluations are used as opportunities to ask different questions and to include researchers who have completed five years of the PPR.

3.1.2.4 Audit Subcriteria: The CFI undertakes continuous improvement in performance measurement and reporting

Conclusion: The CFI undertakes continuous improvement in performance measurement and reporting.

The CFI periodically makes changes to PPR questions to improve the nature of the information gathered although this can complicate comparison of results over time. The CFI also changes the presentation of the PPR analysis to draw out the more informative aspects of the data.

The CIIF application asks for baseline and projections of performance data. Collecting baseline data will allow objective comparison of activities “before” and “after” the infrastructure acquisition to truly gauge the impact on the institution. Similarly, the *MSI Oversight Framework* requires the collection of baseline data for key performance indicators used by MSI.

Since the overall research effort involves multiple funders for infrastructure and for research grants, through the Socio Economic Impact Assessment study, the CFI has explored joint performance measurement projects with other funders to share costs and reduce the burden on the research institutions. Other funders, specifically provincial co-funders and relevant tri-council representatives were invited to observe the OMS expert panel meeting and were offered the panel report when it was available. This allowed other funders to also learn about the outputs, outcomes and impacts of funding in the area as well as hear from institutions about

some of the challenges. In addition, several OMS were conducted in collaboration with NSERC including specific indicators that were of particular interest to NSERC.

Overall Conclusion: The PERAF provides a formal structure for Performance Measurement. Performance reporting of the Expected Results would be strengthened by including each element of the Expected Result as a separate outcome in the logic model and updating the performance measurement framework and evaluation framework accordingly. The CFI developed the PPR to gather annual performance data for all recently completed infrastructure projects. The CFI Annual Report could be enhanced by including relevant information on performance against the Expected Results. The CFI demonstrates continuous improvement in performance reporting.

3.1.3 Stakeholder Engagement

Audit Criteria: The CFI undertakes effective Stakeholder Engagement.

3.1.3.1 Audit Subcriteria: The CFI identifies and actively engages with stakeholders (individually and collectively):

- **to understand their objectives, needs, resources**
- **to communicate the CFI mandate, objectives, capabilities and programs**

Enhancing research at Canadian institutions requires a combination of talented researchers, research funding and infrastructure. In order for the CFI to effectively perform its role in supporting the acquisition and maintenance of infrastructure, it must have a clear understanding of the needs, preferences and challenges of other stakeholders in the research eco-system.

Conclusion: The CFI undertakes an active program of stakeholder engagement.

Stakeholder engagement is an ongoing process at the CFI. Responsibility for stakeholder engagement is distributed across the CFI organization with staff in each unit in contact with their peers in other organizations. Senior Programs Officers (SPOs) are assigned to work with a portfolio of institutions and at least one province. They also interact with the broader research community through participation in events and conferences sponsored by organizations such as the Canadian Association of University Research Administrators. Finance staff participate in events and conferences sponsored by organizations such as Canadian Association of University Business Officers. Directors, VPs and the President participate in interagency working groups with their counterparts in other federally funded granting agencies. They also interact with senior management at institutions, provinces and the federal government.

Planning for meetings and events includes careful consideration of who should be contacted and what information is important to gather. The information gathered through this ongoing interaction is shared throughout the CFI by internal reports, group meetings such as the Business Intelligence working group and directly between staff, as appropriate.

Periodically, the CFI undertakes formal stakeholder engagement to gather stakeholder input on a specific topic. Consultations are conducted in advance of the planning of major funding programs and stakeholders also have an opportunity to provide input on the draft terms of the competition.

In addition to interactions with individual institutions, the CFI communicates on CFI activities on a regular basis with all its stakeholders through the VP Updates emails. The CFI website also contains extensive background documentation on the CFI and the various funds. These were the two sources of information on the CFI that were identified most often in the interviews with stakeholders.

Conclusion: Interviews conducted with stakeholders confirmed a high level of overall satisfaction with stakeholder engagement by the CFI.

Provinces reported strong working relationships built on meetings with the provinces and including the province in meetings with the institutions. They agreed that the CFI looks for provincial input by holding consultations and circulating drafts to gather views on issues such as the MSI fund. The CFI was viewed as being responsive through emails and calls to the concerns of the provinces. Only one province noted dissatisfaction with the level of discussion on O&M funding and with the expectation for the provincial matching funding of projects in the short term.

Institutions were also generally positive about the level of stakeholder engagement. Universities that were more research intensive (U5 and U15) reported that they were consulted directly at least annually and also through the U15 organization. They reported opportunities to provide input through working relationships at all levels on a continuing basis. The responses from colleges and universities with lower levels of research activity were generally positive with some concerns. Some expressed very positive experience in consultation and in carrying weight in the decisions made by the CFI. Others felt that the views of the U15 carried more weight in the design of funds and competitions. Consultations by teleconference were suggested as a way for institutions outside major centers to participate. Participation in outcome measurement studies were noted by smaller institutions as opportunities to build working relationships between their institution and the CFI.

Interviews were undertaken with “end users” identified through discussions with liaison officers at recipient institutions. These end users were often also researchers at the Institution. They reported very little direct interaction with the CFI. This is consistent with the CFI’s approach of interaction mainly at the institutional level.

3.1.3.2 Audit Subcriteria: The CFI has timely knowledge of stakeholder interests and uses this information in program design

Conclusion: Stakeholder information is used in program design.

The CFI undertakes extensive multi-stage consultations with institutions, provinces and relevant associations in the development of Funds and major competitions. Early rounds of consultations are to gather information on the needs, challenges, and opportunities. Once a competition has been designed, stakeholders have an opportunity to review and comment on the draft

documents before they are finalized taking into account issues raised by stakeholders. Recent consultations have been used to design the Innovation Fund competition, the MSI Special competition and the Cyber infrastructure competition.

When the CIIF failed to attract the expected level of applications in the latest competition, a follow-up round of meetings was held with college associations and institutions to identify barriers faced by the colleges and ways the CIIF could be adjusted. Overall, the stakeholders confirmed the program was needed but it would take some time for colleges to be fully ready to apply.

The CFI also gathers stakeholder feedback on CFI processes. A recent review of project oversight practices that focused on "reducing the burden" for recipients included consultations with institutions, provinces and other granting agencies to identify ways to reduce the reporting and oversight burden without compromising the integrity of the oversight process.

In the BBMD survey of Project Leaders and Principal Users under the LEF/NIF and LOF/JELF funds, Project Leaders were asked to rate the design of the CFI Funds (basic elements such as objectives or eligibility criteria). The survey results show strong approval of the design of these two funds indicating the CFI had rightly gauged the interests and needs of researchers in designing these funds.

Table 2: Rating of design of LEF/NIF and LOF/JELF funds

	Mean Rating	**% rating 4 or 5**	**% rating 1 or 2**
Rating of Design			
LEF/NIF	3.8	70%	8%
LOF/JELF	4.0	78%	4%

*Note: 1 to 5 scale, 1 = poor, 5 = excellent. Summary of 1,088 responses.

3.1.3.3 Audit Subcriteria: The CFI communicates research community needs and successes

Conclusion: The CFI communicates research community needs and successes.

The CFI identified "Trusted Voice" as a goal in the CFI Strategic Roadmap 2012-2017.

The CFI devotes significant effort to identifying stories of research success and the resulting benefits to Canada. Through interaction with research institutions, the CFI gathers stories illustrating breakthroughs in discovery science and the application of the resulting technology. These stories are packaged in layperson terms and distributed through various methods.

In the course of doing business, the CFI gathers significant information about the state of the research environment in Canada. It has also developed expertise in conducting consultations across the Canadian research spectrum. In interviews, Industry Canada indicated they valued the

ability to consult with and through the CFI on an "as needed" basis to gain greater insight on research in Canada.

Overall Conclusion: The CFI is well recognized for its efforts in the area of Stakeholder Engagement. Stakeholders expressed their appreciation for the level of engagement and willingness of the CFI to make adjustments, where appropriate, in response to stakeholder feedback. The CFI used the information it gathered through stakeholder engagement to improve the infrastructure funding process. Satisfaction with the design of CFI funds demonstrates that CFI is responding to stakeholder needs. CFI also gathered stories illustrating in laypersons terms, breakthroughs in discovery science and the application of the resulting technology.

3.2 Processes for project selection and oversight contribute to the CFI Expected Results

3.2.1 Project Selection

Audit Criteria: Processes to assess and select projects are effective in aligning funding decisions with the potential to generate Expected Results

3.2.1.1 Audit Subcriteria: Clear roles and responsibilities are established and communicated for each stage of project selection process

The CFI awards are made to the institution, unlike many other research-related awards which are made to the individual researcher. From inception, the CFI has required that Institutions provide a summary of their Strategic Research Plan (SRP) and demonstrate how proposed infrastructure projects align with the institutional SRP.

There is a cap on the dollar value of proposals each institution can submit to a particular competition so the institutions conduct their own internal process to determine which projects will be submitted. Through interviews, the institutions described varying processes, from multi-tiered vetting processes (e.g. faculty approval, then VP Research Committee approval, then external peer reviewed processes followed by University level approval) to open calls for proposals from individual researchers that are reviewed centrally through a single committee. In all cases, Institutions pointed to the benefits of a Strategic Research Plan as being central to their ability to provide a level of transparency and equity to the selection and approval process. It also provides clearer direction to researchers and stakeholders on the research focus and priorities of the Institutions.

Conclusion: Multi-stage merit review process has clear roles and responsibilities.

The LEF/NIF merit review process begins with the consideration of the proposals by panels of experts in the relevant research field. The experts are expected to develop a consensus view on the rating of proposals across a range of criteria and provide comments on the strengths and weaknesses of the proposals to support their ratings. The CFI staff are present at expert review panel discussions to bring clarity to the process, when required. All the proposals are then reviewed at the Multi Disciplinary Assessment Committee (MAC) level. These committees are concerned with calibrating the reviews by the various expert panels to ensure the ratings are consistent with the comments of the panel members. Each MAC committee then makes the first level of selection from among the projects submitted.

LEF/NIF Selection Process

Institutions run internal process to determine which projects to submit
Panel of experts meets to review proposals, reaches consensus on rating
MAC reviews expert panel report, selects projects to recommend based on ratings
S-MAC reviews MAC recommendation, selects projects to recommend to the CFI Board of Directors
The CFI Board of Directors reviews and approves projects

Given that the competitions are over subscribed with many excellent projects, projects must be highly rated on all criteria to be recommended for further consideration. The Special Multi Disciplinary Assessment Committee (S-MAC) then considers all the projects recommended by the various MAC to establish a list of recommended projects for consideration by the CFI Board of Directors. The Board of Directors has the ultimate authority to approve the projects for funding. Therefore, the CFI staff make no decisions on funding, which removes the potential of bias based on ongoing working relationships with the institutions.

The LOF/JELF merit review process also begins with the consideration of the proposals by individual experts in the relevant research field. The experts use on-line reviewer report templates to rate proposals across a range of criteria and provide comments on the strengths and weaknesses of the proposal to support their rating. The experts also give their recommendation on whether the project should be funded. The experts do not meet to discuss their assessments. The CFI staff reconciles the ratings and the recommendations. They may refer the application to an Advisory Panel or a Wise Reviewer if the views of the original expert panel are widely divergent. Once a recommendation is established, it is presented to the Board of Directors for approval.

LOF/JELF Selection Process

Institutions run internal process to determine which projects to submit
Experts individually review proposals to develop ratings and recommendations.
CFI staff reconcile expert ratings and recommendations (refer to Advisory Panel or Wise Reviewer if necessary)
The CFI Board of Directors reviews and approves projects

The roles and responsibilities are clearly defined for each step of the process. They are provided to committee members in Guidelines and notes. Evaluation templates prepared for use in the various stages further clarify the roles and support the experts in fulsome consideration of the proposals and clear documentation of the funding decision.

Board members were clear that they have the final approval of recommended projects. In interviews, Board members noted that while they cannot review all recommended projects in detail, the Board members pay particular attention to establishing that the process leading up to the recommendations was rigorous and transparent to allow them to move ahead with confidence to the approval stage.

3.2.1.2 Audit Subcriteria: Application requirements are aligned with Funding Agreement requirements and include information related to each Expected Results

Conclusion: Application requirements are aligned with Funding Agreement requirements and include information related to the Expected Results.

The FA has clear definitions related to the eligibility of recipients, projects and expenses. Furthermore, the FA has mandatory criteria to evaluate sustainability and partner funding toward the proposed capital assets.

The Applicant Guides distributed by the CFI for each round of funding outlined who is eligible to apply, what types of projects and expenses are eligible, the upper limit on the CFI contributions, and requirements for matching funds. The application forms developed by the CFI provide clear

requirements for applicants to provide mandatory information to ascertain eligibility under the FA and a consistent format for applications to make it easier for staff and external reviewers to find the relevant information.

With respect to meeting the Expected Results in the FA, the CFI has designed the various Funds and competition rounds within each Fund to address certain aspects of the Expected Results, so in total, the portfolio of Funds addresses the overall Expected Results. A review of the information requested in the project application templates for the various Funds showed that the Expert Reviewers would have the required information to determine the project's alignment with the overall CFI Expected Results.

3.2.1.3 Audit Subcriteria: Selection process clearly documents that:

- **Selection criteria respect requirements in funding agreement (eligible recipient, eligible expenditures, allocation of funding)**

- **Rationale for funding decisions are aligned with the objectives of the Fund (Funds align with Expected Results)**

Conclusion: Rationale for funding decisions is aligned with the objectives of the Fund. Funds align with Expected Results.

The audit reviewed a sample of applications to the LEF/NIF, LOF/JELF and CIIF funds. In order to see more clearly how applications were evaluated, the sample was selected on a judgmental basis to include applications that were not approved, were approved for partial funding, were conditionally approved and were approved without conditions.

All applications are first reviewed by staff using a checklist to identify any parts of the applications that are not clearly compliant with the requirements for the eligibility of recipients, projects and expenses as set out in the FA. For the sample of applications selected for the audit, the checklist was always completed. Issues identified by the CFI staff were minor in nature, for example, certain proposed expenses did not meet the definition of infrastructure. These were noted for follow up and adjustment with the applicant, should the project as a whole be recommended for funding.

The funding decision is primarily based on the review of the expert panel as documented in the evaluation and rating against the criteria of the particular Fund as presented to them in the evaluation template. The expert review templates for more recent competitions have been expanded to include more direction to the expert reviewers on the range of issues to consider under each criterion. Review of the expert panel reports (LEF/NIF) or the individual expert reports (LOF/JELF) showed that the experts were providing ratings for each criterion. In a few cases, the documentation of the rationale for the rating was sparse but for the most part, the rationale was clearly aligned with the rating and useful as feedback to the institutions to improve future applications.

For the LEF/NIF projects, the MAC also documented its view of the overall strengths and weaknesses of the proposal and confirmed or adjusted the ratings by criterion. For the LOF/JELF projects, staff members reconciled the ratings and the recommendations of the individual

reviewers. Where there was disagreement among the reviewers on ratings or recommendation, the project would be referred to an Advisory Panel or experienced Wise Reviewer to decide on the recommendation, taking the documentation of the expert reviewers into account.

The focus on research excellence is clear in the selection of projects for funding. Given that the LEF/NIF competitions are oversubscribed with many excellent projects, projects must be highly rated on all criteria to be recommended for further consideration. For the LOF/JELF competitions, the approval of a project triggers the release of funds that have been notionally allocated to the institution. Notwithstanding that the funds have already been allocated, reviewers will recommend against funding any project where an overall standard of excellence in research is not evident.

Through interviews, the provinces reported that they also rely on the CFI expert panel process to evaluate the merit of the research and the infrastructure requested. Most provinces supplement the merit review with an analysis of the alignment with: provincial research priorities; the potential for commercial application, jobs and social economic impact; or the potential to employ highly qualified personnel.

Overall Conclusion: There are clear roles and responsibilities at all stages of the CFI project selection process. The application templates are designed to gather appropriate information on project eligibility and potential to contribute to Expected Results. The project evaluation and selection process identifies excellent projects that are most likely to contribute to the Expected Results.

3.2.2 Project Monitoring

Audit Criteria: Project oversight reflects risks

3.2.2.1 Audit Subcriteria: Project oversight is designed to identify key risks and monitor risk levels and effectiveness of mitigation

Conclusion: Project oversight is designed to identify key risks and monitor risk levels and effectiveness of mitigation.

TRAAM INSTITUTIONAL RISKS
Capacity to Manage
Inappropriate Expenditures
Major Cost Escalations
Major Delays
Planning/Implementation of Portfolio
Sustainability

The primary responsibility for project monitoring at the CFI resides with the Senior Programs Officers (SPOs). Each SPO is assigned to work with a portfolio of institutions and is responsible for monitoring all the projects underway at an institution. The SPOs are supported by, and work closely with, the Finance unit.

Over time, the CFI has developed various checklists to aid the SPOs and the Finance unit in determining what level of monitoring is needed. The Contribution Audit Selection Tool (CAST) checklist was developed to determine if and when a recipient audit of a project would be undertaken. Other checklists completed once the project is

approved for funding highlight common risk factors, for example, projects that include construction of research space in addition to equipment acquisition tend to be more complex and more susceptible to cost escalations and delays.

The current formalized risk assessment process is the project and institutional Tool for Risk Assessment and Management (TRAAM) which is completed by the SPO to analyze various risk areas. A TRAAM is mandatory for individual projects with a CFI contribution over $1 million or for institutions with CFI contributions totaling $10M or more in active projects. For projects involving a CFI contribution below $1 million, the TRAAM is used on an as-needed basis if the project is of higher risk. For example, the TRAAM is being used for the CIIF projects as the CFI and the colleges have less experience working together. Based on the risk analysis, the SPO may decide to add specific oversight requirements to mitigate or monitor the identified risk. The TRAAM system is used to record the rating of risk components and rationale for the assessed risk level. The TRAAM system also tracks the planned oversight and provides reminders of activities that have not been recorded as completed. The TRAAM system includes reminders to review and update risk assessments at least annually.

In reviewing a judgmental sample of projects, the various checklists had been completed and the TRAAM was completed when required for the most recent projects. There was a fair amount of variation in the amount and clarity of the notation that was included in the TRAAM to support the risk rating. Since the original release of the TRAAM set the default rating in each area as low, without notations on the rationale, it is not entirely clear that a risk rating has occurred. This has been addressed in the update of the TRAAM tool by setting a blank rating as the default so the SPO must select ratings to complete the form. As well, instances were noted where a proposed action was described in the risk analysis portion but not included in the proposed action windows that would trigger follow-up reminders.

Recommendation 2: *The CFI should ensure the Tool for Risk Assessment and Management (TRAAM) is being used effectively to document project and institutional risk assessment and to plan and follow up on oversight measures.*

Management response: The TRAAM was introduced in 2013 and one of the challenges identified during the design stage was in fact the variation between the assessments and notations included by the different people that complete the TRAAM. This is expected when numerous people are involved in using a tool. Since its implementation, the Programs and Finance teams have been meeting periodically to review the assessments made and discuss the level of documentation included in the TRAAM. This recommendation will be actioned upon.

3.2.2.2 Audit Subcriteria: The CFI's risk rating of project is updated regularly and discussed with the institution to get its perspective of project risk.

Conclusion: Risk ratings of projects and institutions in TRAAM are updated regularly.

The TRAAM tool includes a reminder to review and update the ratings at least annually. In the review of completed TRAAMS, some SPOs were updating the TRAAM more frequently to note the resolution of risk issues resulting in a reduction of the risk rating.

Conclusion: The CFI does not routinely inquire about the institution's view of project risk.

Other than sustainability, applicants are not asked to address risk and mitigation in their applications. Expert panels sometimes note concerns over risk areas that are not addressed in the application, for example, that expertise to operate complex equipment or to undertake certain testing is not clearly addressed. If such a project is funded, the CFI will perform follow-up procedures to ensure the concerns are addressed.

Monitoring visits explore Institutional risk-based monitoring and oversight. As well, the CFI works collaboratively with each institution in the management of project-related risks. Input from the institution on its management and oversight activities are incorporated in the TRAAM; this may influence the CFI's risk assessment and its level of oversight activities. The CFI is willing to share the completed TRAAM with the respective institution.

3.2.2.3 Audit Subcriteria: Project monitoring is consistent with risk ranking

Conclusion: Project Monitoring is completed as planned. Insufficient information was available to confirm consistency of monitoring with risk ranking.

The CFI does not have a fixed schedule of monitoring and reporting requirements in response to higher risk ratings in particular areas. SPOs have considerable autonomy in decisions on monitoring methods and intensity. However, the rationale of how a particular monitoring activity will address risk is seldom documented in the TRAAM. When combined with limited documentation to support the risk ratings, there was insufficient information to conclude whether the proposed level of project monitoring was consistent with the risk ranking. See Recommendation #2 above on effective use of the TRAAM to document risk assessments and plan and follow up on oversight measures.

Interviews with SPOs report that the main oversight activity is ongoing contact with key contacts at institutions regarding the projects. SPOs consider this contact to be more effective and more proactive than relying on increased reporting.

SPOs have considerable autonomy in approvals of amendments to project schedules and items to be purchased. Factors considered in approval of requests for amendments include consistency with the project as originally approved, supported by informal consultations with other SPOs and review of an information file of previous decisions in similar circumstances. No inconsistencies were noted among the amendments approved in the files tested.

The audit review of monitoring included confirming that reporting requirements noted in project risk assessment were included in the Award Agreement and that the requirements in the Award Agreement were completed. Consistent with the findings in the recent MSI audit, cases were noted where reporting requirements were not included in the Award Agreement or the template for the report had a different title than the requirement in the agreement, potentially causing confusion for the institution about the requirements. It was also noted that a decision to reduce the frequency of reporting was communicated by email to all effected institutions. This is acceptable as a clear communication to avoid the time and effort to update all the active Award Agreements.

Recommendation 3: *The CFI should ensure that all reporting requirements are clearly identified in the Award Agreement.*

Management response: The CFI is currently in the process of reviewing its Award Agreement template and will incorporate all known reporting requirements at the award finalization stage. Since the CFI uses a risk-based management approach, these requirements may change over time if there are changes in project risks.

For projects selected for testing, monitoring was completed as planned. Funding installments were not released until reporting and other requirements were completed.

3.2.2.4 Audit Subcriteria: Insights from monitoring inform risk rating of project/institution/ risk-based approach

Conclusion: Insights from monitoring inform risk rating of projects, institutions and risk-based approach.

The aspects considered in the formal risk rating have been expanded – the TRAAM includes consideration of the sustainability as well as the timeline for the acquisition of the infrastructure.

The dollar value of a project is used as one measure of risk and more frequent financial reporting on the project was implemented for larger projects. Through ongoing monitoring and review of project audits, it was determined that the increased frequency of reporting for some projects was not warranted and was creating more work for the CFI and for the institution. Therefore, general requirements for frequency of financial reporting have been extended to annually and even bi-annually for most projects.

CFI's review of project audit results identified areas where errors are prone to occur. Project audits are targeted to known risk areas (e.g. valuing in-kind contributions, construction). These conditions are also included in checklists to highlight risk areas in new projects.

Monitoring is used to adjust risk rating as a project matures and as institutional capacity in the oversight of infrastructure projects increases. A "best practice" noted in some project TRAAM was the documentation of specific risk areas followed by notations on the resolution of the issue over the course of the project.

Monitoring visits provide more in-depth knowledge of the project oversight undertaken by institutions.

Overall Conclusion: The CFI approach to project oversight is designed to lever the oversight capacity of the recipient institutions. Monitoring visits are undertaken to confirm the oversight capacity in Institutions with high monetary value projects. Each SPO oversees all the projects undertaken by the institutions in their roster. This allows for the development of a working relationship that goes beyond compliance with the required reporting. Tools such as the TRAAM

have been developed to support the SPOs in their oversight role. Over time, the CFI has monitored the effectiveness of its oversight process and adjusted oversight requirements to balance the reporting burden with the benefit.

4. ECONOMY, EFFICIENCY AND EFFECTIVENESS

The FA requires a performance or value for money audit to ensure the economy, efficiency and effectiveness with which funds provided to the CFI have been used. In considering the operations of the CFI, many instances were noted of approaches used by the CFI to promote economy, efficiency and effectiveness in the use of funds and delivery of the CFI mandate.

4.1 Economy in the use of CFI funds

4.1.1 Operating costs

As noted in the OPE, the CFI has maintained its operating costs at a low % of disbursements for many years. Its operating costs as a % of disbursements are lower than those of federal research granting agencies.

The CFI's total operating costs during the period from 2009-10 to 2013-14 are shown in Table 3 below. They ranged from approximately $12.5 million to $14.1 million per year.

Over the 2009-10 to 2013-14 period, the CFI's operating expenses as a % of disbursements ranged from 2.4% to 3.4%. This compared to 3% which was reported in the 2010 OPE report, based upon the 2007 Evaluation of Foundations, which included the CFI.

Table 3: The CFI's Operating Costs as a Percentage of Grant Funds Disbursed

	F09-10	F10-11	F11-12	F12-13	F13-14
Total Operating costs	13,040,979	12,519,725	14,112,567	12,952,516	12,984,778
Disbursements	379,369,095	460,104,290	427,219,788	549,812,706	406,899,214
Operating Expenses as % of Disbursements	3.4%	2.7%	3.3%	2.4%	3.2%

(Source: Provided by CFI, September 19, 2014)

The 2007 Evaluation of Foundations report also stated that "the average share of operating and administration costs in the total expenses of CIHR, NSERC and SSHRC over the last six years was between 5% and 6%". Examination of annual reports indicated that operating costs as percentage of grants and awards in 2011-12 for CIHR, NSERC and SHHRC were 6.4%, 5.5% and 4.6% respectively. Further, data from the 2013-14 Reports on Plans and Priorities revealed that, over the period from 2010-11 to 2013-14, "Internal Services" as a percentage of total expenditures ranged from 2.8% to 3.3% for CIHR, 2.3% to 2.5% for NSERC and 2.2% to 2.5% for SSHRC. Internal Services are a subset of operating expenses and do not include direct program costs which are included in the CFI operating expenses.

In making comparisons across the funding agencies, it is noted that there are differentiating factors such as the average size and number of grants and contributions provided by each agency that also influence these percentages. However, the comparisons do point to the CFI's

operating expenses as a percentage of disbursements continuing to compare favourably with the same percentages for CIHR, NSERC and SSHRC.

In interviews, the CFI staff provided examples of changes made to reduce costs associated with running funding competitions without compromising the effectiveness of the process. Specific instances noted included savings realized through centralized booking of travel for expert panel members and electronic distribution rather than shipping documents required in the review process.

4.1.2 Project Award costs

Economy is considered throughout the selection and oversight of research infrastructure projects. Applications must include a detailed list of the equipment and other infrastructure proposed and the cost of each item. Expert reviewers consider whether the proposed items are necessary to the proposed research and whether the proposed cost is reasonable. Expert panels may recommend partial funding to remove items that are not directly linked to the proposed research or adjust costs that are not considered reasonable. As the acquisition of the infrastructure takes place, the institution must obtain the CFI's approval for significant variances in the nature or the cost of items and must report the actual costs and variances at the conclusion of the project. Selected projects are subject to contribution audits to ensure the project expenditures were consistent with the approved project. All these controls support the funding of infrastructure that is truly required to support the proposed research projects.

Conclusion: The CFI has demonstrated economy in the use of funds for the CFI operating costs and the project award costs.

4.2 Effectiveness in achievement of Expected Results

4.2.1 Understanding the Research landscape

As noted in 3.1.1.2 and 3.1.1.3, the CFI undertook a detailed formal risk assessment to broadly consider the barriers and opportunities to achieving the Expected Results set out in the FA. Mitigation measures were identified, implemented and monitored to deal with barriers.

Stakeholder engagement is an important process to understand the overall research environment. The CFI funds only a portion of the infrastructure costs. Recipients must find matching funds before the project can be finalized and funds released by the CFI. Furthermore, recipients and researchers must also attract funding to support the research before it can be undertaken. Therefore, the CFI must be aware of the priorities and challenges of recipients and funding partners so that the CFI can design competitions that will be aligned with research needs and opportunities. All CFI units have a role in stakeholder engagement. As noted in Section 3.1.3.1, provinces and institutions spoke highly of their ongoing relationship with the CFI and the extent to which the CFI undertook stakeholder engagement through formal and informal approaches.

4.2.2 Merit Review Process

The CFI has developed a widely respected merit review process as the basis for infrastructure awards. The review emphasizes the priority of research excellence. Projects that are not highly rated on research excellence will not be successful in the competitions which are designed to align with the Expected Results.

4.2.3 Projects result in multiple impacts

The CFI Annual Report describes how the various Funds and competitions link to specific Expected Results. Moreover, project reporting shows that projects often result in impacts related to multiple Expected Results. For instance, the frequency of the LOF/JELF competitions and the size of the typical project make this fund well suited to support the attraction and retention of individual researchers. Additionally, researchers reported that the infrastructure obtained through the LEF/NIF projects was also a significant factor in the attraction and retention of individual researchers.

Of the Funds examined in the VFMA, the College-Industry Innovation Fund was the only Fund that specifically required the proposed research to have a direct link to a private sector partner. As well, PPR data for 2011-12 showed that private sector linkages went beyond the CIIF with projects from the LEF/NIF and LOF/JELF funds also reporting private sector users.

4.2.4 Measuring and reporting outputs and outcomes

As noted in 3.1.2, the CFI requires annual reporting through the PPR from over 2,000 operational infrastructure projects. This is supplemented periodically by other data sources that address the broad spectrum of CFI funding such as the voluntary survey conducted for the current OPE and VFMA and more targeted, in-depth studies of specific projects.

The CFI Annual Report describes how the various funds and competitions link to the Expected Results but does not provide information to demonstrate the achievement against the Expected Results. The PPR Analysis Report provides analysis and graphic representation of selected data flowing from the PPR but the effectiveness of the achievement against the Expected Results could be better communicated by including a section in the PPR Analysis Report to report the data relevant to each element of the Expected Results. Analysis of trends in the PPR data over time and by maturity of the projects (Year 2, Year 3 etc) would demonstrate how the impact changes over time.

Conclusion: The CFI has demonstrated effectiveness in the use of funds toward achievement of the Expected Results but could improve the reporting of outcomes to illustrate the extent of the impact of the use of the funds.

4.3 Efficiency in management processes and controls to achieve Expected Results

The CFI uses a wide variety of methods to promote efficiency in the achievement of Expected Results.

4.3.1 Efficiency in the use of mitigation measures

In the CFI risk assessment process, management considers their risk tolerance for each major risk in relation to the residual risk after the application of existing mitigation. Understanding that risks cannot be fully eliminated, additional mitigation is applied only to those risks outside the acceptable tolerance levels. This critical review promotes efficiency in applying resources for mitigation to identified risks.

4.3.2 Competition design and proposal submission mechanisms

The CFI has developed several mechanisms to promote efficiency in the project selection process. The institutional envelope limits the dollar value of proposals that can be submitted for consideration by each institution. Institutions know that to be successful, a project must be competitive under the CFI criteria for that competition and must attract matching funds if selected by the CFI. By putting the onus on the institutions to consider which of the potential projects should be submitted, the CFI promotes the submission of high quality proposals and limits the volume of proposals, thus controlling the costs of running the competitions. The CFI also requires electronic submission of proposals that promotes efficiency in the document management logistics of major competitions. Provincial funding organizations confirmed that they also rely on the CFI expert panel process to reduce the time and effort required to complete the provincial funding decisions.

4.3.3 Oversight at the institutional level

Both the institution and the CFI have the same objective for project oversight – to ensure infrastructure projects are completed on time and on budget. By focusing oversight at the institutional level, the CFI is able to leverage institutional capacity in procurement, contracting, financial administration and project management reducing the need for the CFI to undertake detailed review of the expenditures reported for each project. The CFI uses a risk-based approach to project and institutional monitoring that is now formalized using the TRAAM tool to determine the level and frequency of monitoring.

The CFI undertook a review of its practices with a view to “reducing the burden”. Through consultation with institutions and an internal review, they were able to adjust specific steps within the oversight process to reduce the reporting required by the institutions without compromising the integrity of the oversight process.

The CFI conducts monitoring visits to institutions with the largest number and dollar value of projects. The focus of these visits is to evaluate and make recommendations to improve the institutional capacity in the selection of projects, and the completion and operation of research infrastructure. Comparison of institutional ratings in successive monitoring visits show the institutional capacity to manage the research infrastructure lifecycle is improving. Likewise, the results of contribution audits of selected projects show that institutional project management and financial controls are producing accurate project cost reporting.

Conclusion: The CFI has demonstrated efficiency in the management processes and controls used to ensure funds are used to promote Expected Results.

5. CONCLUSION

While the achievement of the Expected Results is based on the ultimate success of the projects undertaken by recipients, the strength of the CFI operations at the corporate level and at the program level greatly impact the overall achievement of the Expected Results.

The CFI has a clear understanding of the Expected Results in the FA. The CFI uses a risk-based approach to planning and management of activities to achieve the Expected Results. The CFI undertakes formal risk assessments periodically and uses ongoing informal monitoring to assess risk levels and the effectiveness of mitigation.

The CFI has a formal performance measurement plan. However, performance measurement of the Expected Results would be strengthened by including each element of the Expected Result as a separate outcome in the logic model and updating the performance measurement framework and evaluation framework accordingly. The CFI has multiple mechanisms to gather performance data on the impact of the funded infrastructure. This information is analyzed and reported at least annually. The CFI could further demonstrate the impact of funding by reporting summary information on the overall achievement against the Expected Results in its Annual Reports.

The CFI is well recognized for its efforts in the area of Stakeholder Engagement. Stakeholders expressed their appreciation for the level of engagement and for the willingness of the CFI to make adjustments, where appropriate, in response to stakeholder feedback. Responsibility for stakeholder engagement is distributed throughout the organization with all units having formal responsibilities to engage with their peers in recipient institutions and other funding organizations. The CFI has mechanisms to efficiently share the gathered intelligence within the organization.

The merit review process used by the CFI in project selection is robust and highly valued by the research community and funders. It effectively aligns the portfolio of projects selected with the Expected Results of the FA.

The CFI's approach to project monitoring works in partnership with recipient institutions that also have a vested interest in infrastructure being acquired on time and on budget. The CFI risk-based approach to project monitoring is designed to balance effective oversight with reducing the burden of oversight and reporting where appropriate.

The CFI demonstrates economy in the use of funds to fulfill its mandate. The CFI is a lean organization that provides robust and well-rounded operations while maintaining internal operating costs at a low percentage of the expenditures on infrastructure awards. Likewise, the expert panel review conducted for project selection includes scrutiny of the proposed infrastructure to ensure all components are necessary and proposed costs are reasonable.

The CFI promotes effective use of the funds by ongoing efforts in stakeholder engagement to understand the evolving research environment. The merit review process for project selection puts a high emphasis on research excellence. The selected projects often have multiple impacts

toward the Expected Results. The CFI gathers and analyzes data from all the funded projects to demonstrate that the infrastructure has indeed resulted in the intended impacts.

The CFI demonstrates efficiency by continually reviewing its processes in all areas. Risks are identified and assessed in order to determine whether current mitigation measures are effective and where further mitigation is needed. The competition design involves the institutions in making strategic selection of projects for submission. Institutional capacity for project oversight is assessed and utilized in recognition of the common interest of CFI and the institution to complete projects on time and on budget.

Overall, the CFI is a robust and mature organization that seeks continual improvement in order to deliver on its mandate while being mindful of economy, effectiveness and efficiency.

APPENDICES

Appendix A: CFI Project Approvals by Funding Program

Canada Foundation for Innovation
Project Selection Activity by Funding Stream - Year of Board Approval
Year ending March 31
Number of Projects / Dollar value in Millions

Funds		**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Leading Edge/New Initiatives	#	86			133			75	
	$	$324.9M			$513.1M			$166.0M	
John R. Evans Leaders Fund	#	509	562	437	493	426	466	397	330
	$	$80.0M	$87.1M	$70.0M	$84.2M	$74.7M	$85.6M	$61.2M	$84.6M
College Industry Innovation Fund	#						17	17	
	$						$11.8M	$9.6M	
Major Science Initiatives	#						4		
	$						$178.6M		
Automotive Partnership Canada Fund	#				1	2	4	2	4
	$				$0.4M	$1.6M	$2.9M	$0.5M	$3.7M

Appendix B: CFI Project Distributions by Funding Program

Canada Foundation for Innovation
Disbursement of project funding
Year ending March 31
(Dollar value in Millions)

Funds	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**Total**
Career Awards		0.1				0.1
Canada Research Chairs	3.3	1.3	0.4	0.2	0.1	5.3
Exceptional Opportunities	0.9	0.2	2.3	0.8		4.2
Innovation	80.6	50.6	22.4	9.1	3.0	165.7
International	22.4	4.2	10.6	9.3	6.1	52.6
John R. Evans Leaders Fund	78.1	85.3	72.2	80.1	88.5	404.2
Leading Edge/New Initiatives	44.4	168.6	123.1	156.2	150.1	642.4
National Platforms	6.1	26.5	7.4	6.8	0.2	47.0
New Opportunities	3.5	0.8	0.2	0.1	0.5	5.1
Research Hospital	71.9	49.5	66.8	153.1	31.5	372.8
Automotive		0.3	0.7	2.7	1.1	4.8
Major Science				23.2	34.2	57.4
College				5.1	12.2	17.3
Infrastructure Operating Fund	68.2	72.7	121.1	103.1	79.4	444.5
Total	379.4	460.1	427.2	549.8	406.9	2,223.4