

Chapter 3

Section 3.10

Ministry of Research and Innovation

Ontario Research Fund

Background

The Ontario Research Fund (Fund) program was created in 2004 to “support scientific excellence by supporting research that can be developed into innovative goods and services that will boost Ontario’s economy.” The program aims to keep Ontario’s researchers at the leading edge by supporting the direct and indirect operational costs of research through its Research Excellence Program, and the capital costs of research through its Large Infrastructure Program and Small Infrastructure Program. The Fund is the responsibility of the Ministry of Research and Innovation (Ministry), which was created in 2005 and focuses its efforts on activities that support Ontario’s knowledge economy and create high-value jobs. Previously, research funding had been delivered by the Ministry of Economic Development and Trade under various other programs. The guiding principles of the new ministry, as stated in the Ontario Innovation Agenda, include extracting value from public research investments through commercialization and investment in research that will create jobs.

The Ministry has dedicated approximately 15 full-time employees and five support staff to deliver the Fund program. There is no specific legislation related to the Fund, as the program was established

by an approved cabinet submission. The program provides research grants to institutions, primarily universities, and requires the research institution to obtain private-sector and institutional support in addition to program funding. The program also requires an advisory board and peer review panels to review research proposals and recommend projects for funding.

Since the inception of the Fund in 2004 to March 31, 2009, transfer payment expenses for the capital and operating components of the program have amounted to \$303 million, with total announced program commitments of \$623 million, as shown in Figure 1. Other commitments as reflected in Figure 1 represent contribution commitments from research institutions and the private sector.

Audit Objective and Scope

The objective of our audit of the Ontario Research Fund was to assess whether the Ministry had satisfactory systems and procedures in place to:

- measure and report on the program’s effectiveness in fulfilling its objectives;
- ensure that resources were being managed with due regard for economy and efficiency; and

Figure 1: Ontario Research Fund Program Commitments, 2004/05–2008/09

Source of data: Ministry of Research and Innovation

Program	# of Projects	Total Expended (\$ million)	Ministry Commitments (\$ million)	Other Commitments (\$ million)	Total Commitments (\$ million)
Research Excellence Program (operating)	71	81	306	580	886
Research Infrastructure Program (capital)					
Large Infrastructure Program	89	117	173	519	692
Small Infrastructure Program	906	105	144	233	377
Total	1,066	303	623	1,332	1,955

- ensure compliance with government directives, ministry policies, and contractual arrangements.

The scope of our audit included discussions with ministry staff, an analysis of relevant files and other documents, and a review of research programs and practices in other jurisdictions. In addition, we spoke with several peer review panel members who review Research Excellence Program proposals for their input on the program. Our audit also included a review of the activities of the Ministry's Internal Audit Services Branch. We reviewed the Branch's recent reports and incorporated any relevant issues into our audit work.

Summary

In our 2003 audit of the Science and Technology Division of the former Ministry of Enterprise, Opportunity and Innovation, we reported significant concern over the lack of effective governance and accountability mechanisms in place for the management of various Ontario research programs. At the time, the province was using external agencies to administer key government research programs. The consolidation of operating and capital research funding into one comprehensive program that is fully managed and administered by the Ministry of Research and Innovation (Ministry) has helped to address this concern. The Ministry has also established a fair and transparent peer

review process to evaluate research proposals and make funding recommendations to the Minister. However, there are still a number of areas where improvements are required. For example:

- The Ontario Research Fund's (Fund's) overall mandate emphasizes supporting research that will provide economic and social benefits for the people of Ontario through the commercialization of research from our publicly funded research institutions. In a 2004 appearance before the Standing Committee on Public Accounts, the then Deputy Minister stated, "we need to heighten the focus on results, commercialization, that far end of the spectrum." However, \$623 million has been committed to research projects in the province and most of the research funded was for basic (that is, theoretical) research that was not focused on commercial potential.
- In our 2003 audit, we noted that the Ministry did not have adequate guidelines in place requiring the institutions it funds to ensure that the research funded will ultimately benefit Ontario. The current policy is to delegate intellectual property management to the institution and allow ownership of any benefits to vest with either the institution or the researcher, who could move to another jurisdiction. This practice has resulted in intellectual property policies that are inconsistent from one institution to another. We noted that, to ensure that research benefits remain within the funding jurisdiction, other jurisdictions

require ownership of intellectual property to rest with the research institution.

- The Ministry now reports on how its programs are performing against three stated targets: the dollar value of investments leveraged from the private sector, the number of individuals with enhanced skills involved in Ministry-funded projects, and active licences that resulted from Ministry-funded projects. However, the Ministry does not measure or report publicly on the program's contribution to the Ministry's overall strategy of creating high-paying jobs and commercializing research. More information is required to assess whether the program is achieving its objectives.
- The Ministry did not have an adequate process in place to ensure that the projects funded through the Large Infrastructure Program supported Ontario's strategic priorities or provided strategic benefits to Ontario. The Ministry generally based its funding on the decisions of the Canada Foundation for Innovation (CFI), with the result that the province funded projects worth \$41.5 million that did not directly support Ontario's strategic priorities. In addition, although we found that the Research Excellence Program selection process was fair and in accordance with program policies, \$65 million of program funding was allocated to some very large projects where it was questionable whether they met the program's eligibility criteria, although we were advised that they were very worthwhile projects for Ontario.
- The Ministry relied on federal CFI processes to monitor Research Infrastructure Program grants and did not sufficiently assess or review the CFI's work to ensure that more than \$300 million in program funding commitments was being spent for the approved purpose. The Ministry does not perform its own site visits because it is entitled to receive the results of CFI site visits and audits of Ontario co-funded projects. However, we found that

the Ministry had not requested or received any of this information from the CFI.

- Ontario's colleges tend to focus on applied programs and research and helping small- to medium-sized businesses develop new or improved technologies and processes for the marketplace. Such research provides direct opportunities to contribute to Ontario's economic growth. Colleges are eligible for funding through the Fund, but since the inception of the program no funding has been awarded directly to Ontario's colleges. Given that commercialization of research projects is one of the key program objectives, the Ministry should assess the potential benefits of applied research projects that both address the unique needs of Ontario's colleges and offer enhanced commercialization potential.
- As part of the monitoring process for the Research Excellence Program, the Ministry receives various reports from grant recipients. However, we found that the Ministry had not performed any formal monitoring or clarified its expectations for independent audits to verify the information submitted by recipients, to determine whether program funds were being spent for the intended purpose, and to gauge whether the recipients' performance was satisfactory.

Detailed Audit Observations

PROGRAM OBJECTIVES, BENEFITS, AND REPORTING EFFECTIVENESS

Program Objectives

The report entitled *The State of the Nation 2008: Canada's Science, Technology and Innovation System* issued by the Science, Technology and Innovation Council concluded that, despite Canada's significant strengths in many fields of research, it was not translating its strength in basic science into

sustained commercial success as effectively as other nations have done.

The Ontario Research Fund (Fund) program was created under the Ministry of Economic Development and Trade's 2004 science and technology strategy, which is still the guiding document for the program. This strategy was developed to support government priorities and to help Ontario achieve long-term prosperity through innovation that creates high-paying jobs, provides people with the skills they need for those jobs, and brings leading products to market. Specific goals of the strategy are to improve Ontario's performance in commercializing research, sustain research excellence, and leverage funding from private-sector partners.

When the government introduced the new research program in the Legislature, the Minister made the following statement:

We're creating a new Ontario Research Fund, which will do three things: It'll make us more accountable and transparent, make certain that there is a made-in-Ontario set of policies toward research and commercialization, and place a greater emphasis on commercialization as well. In addition to this, we have a commercialization strategy which will take good ideas out of our labs and ensure that they get to the marketplace with some degree of success.

The Cabinet submission proposing the Fund also emphasized the importance of commercialization of funded research.

In 2005, responsibility for the Fund shifted to the newly created Ministry of Research and Innovation (Ministry). The guiding principles of the new ministry, as stated in the Ontario Innovation Agenda, include extracting value from public research investments through commercialization and investing in research that will create jobs, contribute to a cleaner environment, and result in better health care for Ontario families.

The Fund contributes to Ontario's science and technology strategy and the Ministry's overall mandate by supporting research that can be developed into innovative goods and services to advance Ontario's economy. Specifically, one of the goals of the Research Excellence Program is to focus on commercialization of research, while the Research Infrastructure Program is meant to ensure that institutions have state-of-the-art infrastructure to engage in technology development.

The importance of commercialization of research to Ontario was noted in the original cabinet submission, but we found that most funding was for basic theoretical research as opposed to applied research, which is more focused on commercial potential. With the Research Excellence Program, the Ministry does not formally keep track of, or report on, the percentage of projects that have applied or commercial value. For the Large Infrastructure Program, we found that almost 80% of the funds requested in 2007/08 were for basic research (that is, lacking commercial potential), and, consequently, were not aligned with commercialization, one of the program's goals.

RECOMMENDATION 1

To ensure that the Ontario Research Fund (Fund) program supports the Ministry of Research and Innovation's (Ministry's) overall strategy of job creation and is consistent with the Fund's commercialization objective, the Ministry should place more emphasis on funding projects that have viable commercial potential.

MINISTRY RESPONSE

The Ministry will ensure that commercialization potential continues to be evaluated during the selection process and that commercialization milestones are met as Fund projects progress. Commercialization potential is a key criterion of any funding decision of the Fund, together with research excellence, strategic value, and relevance to Ontario.

Benefits of Research Projects

The benefits of research investments should make an important contribution to Ontario's prosperity. Research produces ideas and knowledge that stimulate economic and social growth with new and improved technologies and products, and the creation of new companies and industries. Research discoveries achieve commercial value when they are put to use by industries and businesses. The Fund program is intended to support research that can be developed into innovative goods and services that will boost Ontario's economy; consequently, ensuring commercialization of research results is important for Ontario to realize the benefits of publicly sponsored research.

Commercialization of research results developed within an institution is typically accomplished through the transfer of intellectual property (IP) to an existing or new company. Intellectual property rights represent the legal ownership resulting from research and academic activities that can result in patents, trademarks, and copyrights. The owner of intellectual property has the right to exclude others from using it, and ownership can be transferred or sold.

The Ministry has cited several concerns regarding intellectual property in Ontario, including:

- Businesses are often unaware of the intellectual property created within public research institutions.
- Industry's access to intellectual property is hindered by a lack of consistent policies across Ontario research institutions.
- The commercialization of intellectual property may require complex and time-consuming negotiations, often with several institutions with different policies.

In an appearance before the Standing Committee on Public Accounts in 2004, the then Deputy Minister stated: "The approach taken in the development of intellectual policy options will be consistent with similar programs in competitor jurisdictions in Canada and North America. The target date for completion is the end of this year."

In a 2006 report to the Premier, the Ontario Research and Innovation Council stated that "Ontario needs an effective intellectual property system that ensures a healthy expedient flow of intellectual property out of universities to market," and recommended that "the Government of Ontario should also ensure that IP access policy is enshrined within public sector funding agreements, in order to promote knowledge and IP transfer of publicly funded research."

We reviewed the Fund program guidelines and other ministry documents to determine what the Ministry does to ensure that potential research discoveries benefit Ontario and its taxpayers. We found that the Ministry "delegates intellectual property management to institutions on the expectation that it will be managed in the best interest of Ontario, and encourages research institutions to use best practices in managing IP and transferring technology to the marketplace." However, the Ministry did not advocate or have general guidelines or best practices in place to assist research institutions in identifying, protecting, and commercializing intellectual property to maximize the benefits of research for Ontario.

Program guidelines indicate that the Ministry does not claim ownership or rights to any intellectual property resulting from research funded through the program, and that these rights are determined by the institutions' intellectual property policy. The Ministry's contracts under the Research Excellence Program allow intellectual property rights to belong to either the researcher or the recipient institution, while contracts under the Research Infrastructure Program contain no clauses regarding intellectual property rights.

The Ministry informed us that, as a condition of funding, program proposals require a description of the institution's policy for intellectual property protection and disposition. However, the institution's intellectual property policy is not formally evaluated during the peer review process or reviewed by the Ministry for adequacy.

In our follow-up report to our 2003 value-for-money audit of the science and technology programs, the Ministry informed us that it had established a Commercial Advisory Council whose key tasks included reviewing intellectual property barriers to commercialization, with the expectation that a consistent policy for science and technology programs would result. However, during our current audit, we were informed that, owing to a realignment of government ministries, the council met only once, and no results ever materialized.

We noted that several other jurisdictions, such as Quebec, Ireland, and Australia, have developed common guidelines for managing intellectual property for publicly funded research. The overall purpose of these guidelines is for the government to promote consistent good practices across research institutions for intellectual property management and commercialization of research results, while maximizing the benefits of publicly funded research to taxpayers and the economy. All of these jurisdictions promote the practice of placing intellectual property ownership with the research institutions, as opposed to the researchers. Generally, this is seen as good practice because institutions have the appropriate resources and experience to manage intellectual property and will do so for the benefit of the local economy, whereas individual researchers who own intellectual property could move to another jurisdiction. In addition, having one party with title to the intellectual property is an important incentive for industry and businesses that are interested in using research discoveries.

RECOMMENDATION 2

To better promote the commercialization of research done at Ontario's publicly funded research institutions and ensure that the social and economic benefits of the research are retained in Ontario, the Ministry of Research and Innovation should continue to review best practices for intellectual property management in other jurisdictions and, on the basis of the

best practices identified, implement consistent guidelines for the management of intellectual property across Ontario's publicly funded research institutions.

MINISTRY RESPONSE

The most effective approach to managing intellectual property (IP) remains an ongoing topic of debate within the research community across Ontario and Canada.

The Ministry will continue to actively review best practices pertaining to IP management that are consistent with the Ontario Innovation Agenda.

The Ministry will continue to work with universities, research institutions, industry, and the financial sector to address issues of IP policy and management and encourage the development of IP models and approaches that will maximize the benefits of research programs to Ontario.

The Ministry acknowledges the various approaches used by Ontario's research institutions to manage IP and recognizes noteworthy examples where best practices for IP management have been implemented in institutions across Ontario.

Measuring and Reporting on Program Effectiveness

It is important for the Ministry to demonstrate that its programs are effective and how they provide value to Ontario. Well-defined program objectives are the basis for developing specific performance measures. Measuring and reporting on program performance is meant to guide decision-making and to demonstrate the Ministry's accountability for achieving results.

We reviewed the performance-measurement process for the Fund and found that there were only limited requirements for reporting results. As part of the government's business-planning process,

the Ministry is required to report annually on the aggregate results for all its programs, including the Fund. Specifically, the Ministry reports on how its programs are performing against three stated targets: leveraged investment; the number of individuals with enhanced skills involved in Ministry-funded projects; and active licences that resulted from Ministry-funded projects.

In the February 2004 meeting of the Standing Committee on Public Accounts to review our 2003 audit report on the Science and Technology Division, the Ministry stated that “we are committed to measuring the contribution our programs make in promoting the growth of high-paying jobs.” The Ministry also said that the objective of the program was “to create knowledge, add to high-value jobs and create a climate that fosters commercialization of research.”

The Ministry recently completed an inter-jurisdictional review of performance measures and is planning to develop a number of indicators for the public reporting of research and commercialization results. Although some performance measures have been developed, the Ministry does not measure or report publicly on the Fund’s achievement in supporting its goal of creating high-paying jobs.

The Ministry produces a report on the results of the Research Infrastructure Program from data collected by the federal Canada Foundation for Innovation (CFI). Some key information is captured, such as the number of patents resulting from projects the CFI and Ontario have funded, but this information is not reported publicly.

Although these measures give some indication of the results being obtained for some of the research grants provided, the Ministry has not established any measurable targets or goals against which performance can be benchmarked. We were informed that, as part of a ministry-wide performance-measurement review, the Ministry will be redeveloping performance measures and setting performance targets for each of its programs, including the Fund.

RECOMMENDATION 3

To improve its accountability to the public and its ability to measure the results being obtained for the grants provided by the Ontario Research Fund (Fund), the Ministry of Research and Innovation should:

- develop program-specific measures, targets, and benchmarks to assess the Fund’s contributions to its overall goals of supporting job creation and the commercialization of research; and
- periodically report to the Legislature and the public on the achievement of these measures.

MINISTRY RESPONSE

The Ministry is reviewing its existing performance measures with the goal of improving program-specific and impact-focused performance measures. Our objective is to improve the Ministry’s ability to measure the impact of the Fund’s programs in terms of strategic objectives and government priorities.

This objective is in keeping with the mandate of the Ontario Innovation Agenda, which calls for effective program measures to be in place for all key research and innovation programs.

In the next phase of the development of the Fund, the Ministry is committed to implementing a system of program evaluation to measure the economic and societal impact of all Ontario Research Fund programs.

PROJECT SELECTION

The Ministry is ultimately responsible for ensuring that the selection of potential research projects best achieves the Fund’s goals and complies with specified eligibility criteria. To ensure that funds are provided to the most deserving proposals, a fair, effective, and transparent selection process must

be used. We reviewed the selection process for the Research Excellence Program and the Research Infrastructure Program.

Research Excellence Program

The Research Excellence Program focuses on scientific excellence, strong commercialization, and strategic value to Ontario, and targets new, leading-edge research initiatives. The program supports the operating costs of research, including an indirect cost component of up to 40% of a project's direct costs. Total funding for individual projects is derived from equal contributions by the Ministry, the research institution, and the private sector. The Research Excellence Program generally requires one-third of the project costs to be funded through private-sector contributions. The intent of this requirement is to encourage partnerships between research institutions and the private sector, and to encourage commercialization. As of March 2009, the Minister had approved 71 Research Excellence Program projects, for a total ministry commitment of \$306 million, with research institutions and private-sector partners committed to contribute additional funding of \$309 million and \$271 million, respectively.

Peer review panels evaluate all Research Excellence Program proposals to help in the selection of projects that best meet the program-eligibility criteria. On the basis of advice given by the panels, the Ontario Research Fund Advisory Board, made up of senior level executives from the academic, government, research, and business communities, makes funding recommendations to the Minister, who makes the final decision on the proposals that will be funded. We reviewed the Research Excellence Program selection process and found that most projects met program-eligibility criteria and went through a review process that was fair and transparent. However, we noted a few major exceptions.

Program guidelines state that the research funded should remain sustainable after provincial funding is no longer available. We found that the

Ministry did not always ensure compliance with this eligibility criterion. Specifically, the Ministry awarded \$40.5 million (Research Excellence Program—\$30.5 million; Research Infrastructure Program—\$10 million) to three research facilities that provide computing services to researchers throughout Ontario. The research facilities funded include an operational and infrastructure component, and utilize large supercomputers that help provide support to research in a broad range of disciplines from economics to biomedical engineering. Although ministry staff informed us that these facilities are necessary to support research in the province, they are not sustainable without continued government funding. Two of these facilities had received \$23.7 million in provincial funding from previous research programs.

The Ministry was not always consistent in applying the program-eligibility criteria to ensure that only eligible projects were selected. Specifically, a laboratory was provided funding of \$23.5 million (Research Excellence Program—\$17.9 million; Research Infrastructure Program—\$5.6 million) on the basis of its strategic value to Ontario. Although it was given an outstanding rating for commercialization by the peer review panel, the Advisory Board noted that the laboratory lacked commercialization potential and it was questionable whether it was a defined project under the guidelines. The project was then referred by the Advisory Board to the Minister for a final funding decision. We noted that, in situations such as these, there may be more appropriate funding sources. For example, the Ministry awarded \$15 million through another funding source to a similar proposal that had been rejected for funding through the program because there was no expectation of commercialization in the immediate future.

RECOMMENDATION 4

To ensure that the Research Excellence Program follows a selection process that is not only fair and transparent but promotes the program's

goals, the Ministry of Research and Innovation should ensure that all approved proposals meet program-eligibility requirements.

MINISTRY RESPONSE

To date, all projects that have received funding through the Fund have gone through the adjudication and selection process. The Ministry will continue to ensure that all proposals are reviewed against program-eligibility requirements as part of the approved adjudication and selection process by the Fund's Advisory Board. The Board will continue to refer any exceptions to the Minister for final decision.

Research Infrastructure Program

The Research Infrastructure Program ensures that Ontario's publicly funded research institutions continue to have competitive, state-of-the-art infrastructure to engage in world-leading research and technology development. This program has two components, the Large Infrastructure Program and the Small Infrastructure Program. The Large Infrastructure Program is directed toward large, strategic investments in research facilities that stimulate technology development, while the Small Infrastructure Program is directed toward investments that help attract, retain, and develop researchers by providing funds needed to keep their laboratories and equipment up to date.

The Research Infrastructure Program is based on a co-funding model with the Canada Foundation for Innovation (CFI), a corporation created by the federal government to fund research. The program allows research institutions to leverage federal infrastructure awards toward projects that advance Ontario's innovation goals and priorities. The province typically contributes up to a maximum of 40% of eligible costs, while the CFI contributes 40%, and the research institution and private funding partners fund the remaining 20% of a project's cost.

As of March 2009, the Minister had approved 995 Research Infrastructure Program projects for a total ministry commitment of \$317 million, with the CFI and other partners (research institutions and the private sector) contributing additional funding commitments of \$457 million and \$293 million, respectively.

The peer review process that evaluates the scientific merit of research infrastructure proposals is managed by the CFI. To avoid duplication of efforts, the Ministry generally relies on the CFI's decisions regarding which projects should be funded. For the Large Infrastructure Program, the Ministry informs the CFI of proposals that it believes best meet Ontario's goals and should be funded. On the basis of the CFI's funding decisions, the Advisory Board makes funding recommendations to the Minister, who makes the final decision on the proposals to be funded.

We reviewed this process and found that the Ministry generally approved those projects that the CFI had decided to fund and did not always ensure that the proposals selected supported Ontario's strategic goals, such as the commercialization of research. More specifically, for the Large Infrastructure Program, the Ministry matched the CFI funding decisions for 40% of funded projects worth \$41.5 million that the Ministry did not recommend as being highly aligned with Ontario's priorities, and the CFI rejected funding for proposals worth \$18 million that the Ministry had identified as highly aligned with Ontario's strategic priorities. We were advised that for the 2009 round of Large Infrastructure Program proposal selections, the Ministry intends to review all applications to assess the strategic benefits to Ontario and does not plan to automatically match funding of CFI-selected projects. The Ministry will continue to match the CFI award decisions for the Small Infrastructure Program.

In addition, to be considered for Research Infrastructure Program funding, the Ministry requires research institutions to apply to both the CFI and Ontario. However, we noted that in two other jurisdictions, British Columbia and Alberta, to ensure

that projects with substantial provincial benefits are funded, research institutions are able to submit applications and receive funding even if they are not associated with a federal CFI application.

RECOMMENDATION 5

To ensure that projects funded by the Research Infrastructure Program are economically beneficial to Ontario, the Ministry of Research and Innovation should:

- only fund projects that are highly aligned with Ontario's priorities; and
- consider funding projects that have not applied to, or received funding from, the Canada Foundation for Innovation, if they offer significant benefits to Ontario.

MINISTRY RESPONSE

In the most recent round of the Ontario Research Fund—Large Infrastructure competition, the Ministry established Strategic Value Peer Review panels to make recommendations to the Fund's Advisory Board on the extent to which proposals were aligned with Ontario's strategic priorities. As a result of this process, the Ministry will fund only those projects that are aligned with Ontario's priorities.

Colleges and Smaller Institutions

There are 24 colleges in Ontario, with operations in over 100 Ontario communities. According to the Ontario Innovation Agenda, Ontario's community colleges are highly responsive to the needs and interests of local communities and industries, making them an important link in responding quickly to changing skill requirements. Many colleges also work closely with small- to medium-sized enterprises (SMEs) in particular, using their capacity for applied research and development to solve a company's problems. This provides colleges with

an important role in contributing to Ontario's economic growth, as over 99% of businesses in Ontario are SMEs.

Traditionally, research funds have been more accessible to large universities than to smaller universities and colleges. Since the inception of the Fund, most of its funding has been allocated to universities, with three universities receiving over 40% of total program funding. Although colleges are eligible to apply, no funding has been directly awarded to an Ontario college through the Fund. We found that colleges have been excluded from Small Infrastructure Program funding because the CFI specifically excludes colleges from receiving program funding (although at the federal level another agency has a program dedicated to funding colleges).

We contacted half the colleges in Ontario to obtain feedback on how the program could be improved to be more accessible to colleges. All agreed that Ontario would benefit from a provincial research program dedicated to colleges and smaller institutions that addressed their unique needs and infrastructures. Also, the majority of respondents said their college has close ties and partnerships with SMEs. For example, one college indicated that over half the research it conducts is based on specific requests from SMEs, while another college informed us that it had over 40 ongoing projects with SMEs.

Colleges do receive some funding from other ministry programs such as the Ontario Research Commercialization Program (ORCP) and the Ontario Centres of Excellence. For example, the government announced funding of \$10 million over three years from the ORCP to the Colleges Ontario Network for Industry and Innovation to help SMEs with hands-on applied research, technology transfer, and commercialization. However, the colleges we spoke to indicated that these programs do not provide continuous long-term support to build the colleges' research capacity.

RECOMMENDATION 6

To ensure that the Ontario Research Fund selection process is accessible to all eligible applicants, and to help meet the program's overall goal of commercialization of research, the Ministry of Research and Innovation should work with colleges, smaller institutions, and federal research agencies to ensure that the specific requirements and infrastructure needs of Ontario colleges and smaller institutions that focus on applied research are given appropriate consideration.

MINISTRY RESPONSE

The Ministry recognizes that colleges and smaller institutions have exhibited a lower success rate in Fund competitions than larger institutions. The Ministry will continue to conduct outreach with colleges, smaller institutions, and federal research agencies to ensure that the needs of these stakeholders are understood. In addition, the Ministry will continue to look for opportunities to strengthen research capacity in colleges and smaller institutions through the Fund and other programs, such as the Colleges Ontario Network for Industry and Innovation, as noted in the Auditor General's report.

PROJECT MONITORING

Monitoring is an ongoing process that may include activities such as site visits, phone and written inquiries, the review and analysis of reports, and follow-up of information received. The financial and operational performance of grant recipients should be reviewed and monitored throughout the grant cycle to ensure that program objectives are achieved efficiently and effectively and public funds used responsibly. The Management Board of Cabinet directive, Transfer Payment Accountability, also requires ministries to communicate with grant

recipients on a regular basis, monitor the results for contracted projects, and take corrective action where a grant recipient has failed to meet contractual obligations. Appropriate and timely monitoring is necessary to ensure that public funds are used for the purposes specified in the agreements and unused funds returned to the province.

In our 2003 audit of the Science and Technology Division of the former Ministry of Enterprise, Opportunity and Innovation, we reported some significant concerns over the governance and accountability mechanisms in place for the management of various Ontario research programs. Specifically, the Ministry had provided the Ontario Innovation Trust with \$750 million to fund the capital costs of research in Ontario, but the Ministry was receiving virtually no information from the Trust and did not have the required monitoring processes in place to hold the Trust accountable for its expenditures of public funds. Also, the Innovation Institute of Ontario, a not-for-profit corporation responsible for the administration of the operational costs of research, did not retain research proposal assessments to support the decisions it made to fund specific projects.

We believe that consolidation of operating and capital research funding into one comprehensive program that is managed and administered by the Ministry has improved the Ministry's ability to effectively oversee its research grant program. Nevertheless, in our review of the Ministry's monitoring processes for both the Research Excellence Program and the Research Infrastructure Program, we noted areas where improvements could be made.

Research Excellence Program

To assist in monitoring recipients of Research Excellence Program grants, the Ministry receives quarterly requests for payment, annual progress reports (APRs), independent financial audit reports, and reports on performance measures from grant recipients at various stages of their projects.

We reviewed the monitoring process and noted the following:

- The request for payment is an important tool that the Ministry uses to monitor the financial progress of a project; consequently, grant agreements require recipients to report and request payment on a quarterly basis. Specifically, the Ministry uses the quarterly submissions to ensure that the private sector is contributing its share of project costs and to determine if project expenses are in line with the original budget. Monitoring private-sector contributions tells the Ministry if a project has industry support. According to the grant agreement, the Ministry's commitment is contingent upon the private sector's fulfilling its share. From our sample of projects, we found that 65% of recipients had not submitted requests on a timely basis (that is, quarterly); on average, requests were six months late. Although ministry staff generally followed up, this was normally done five months after the recipient should have filed its quarterly report. Also, in half the projects we reviewed, the private sector was under-contributing its share of project costs. The private sector had agreed to contribute \$35 million to these projects, but only \$21 million had been provided, resulting in a shortfall of \$14 million. Program staff informed us that some of the projects had start-up or operational delays, others had lost private-sector funding and were finding replacement funds, and many were delayed in reporting because collaborating institutions had not reported to the lead institution. More timely and thorough follow-up is needed to determine if the program should continue to fund projects that are not meeting their commitments.
- APRs are required from recipients to determine whether a project is meeting its milestones and deliverables as agreed to in the grant agreement, and whether the project is on schedule. APRs also describe the project's

broader impacts and scientific achievements. Overall, APRs were being received, although many were submitted late. Ministry staff generally followed up with grant recipients, but the first reminder usually came six months after a report was due. We found the Ministry had not performed formal site-monitoring visits to assess the progress of the funded projects. Because of the technical and scientific nature of the research projects, independent expert verification may be helpful, especially on the larger projects, to assess whether projects are progressing as intended. Many of the most prestigious academic and private research facilities in the United States have recently been accused of serious improprieties. Some of the more common improprieties related to research grants are falsifying progress reports, research data, results, and other documentation, and using grant money for other unrelated research or personal expenses. Routine site visits and independent expert assistance could help prevent and identify such situations. As well, it would send a message to the research community about the Ministry's concern that research funding be used only for the approved purpose.

- The Ministry receives independent financial audit reports at various times during a project, depending on the value of the grant. Generally, projects over \$5 million require an audited annual report. For projects under \$5 million the requirements vary, but at least one final report is required. However, the Ministry has not developed clear terms of reference on the required contents of the audit reports and what the audits are expected to accomplish. We reviewed several audit reports submitted by recipients and found that most of the audit reports were submitted late and the content of the reports was inconsistent. A few of the reports briefly described the basis of accounting used, but most did not. In one-third of the reports reviewed, revenue

and expenses could not be verified by the accountant, but the Ministry did not follow up. Generally, the usefulness of these reports for monitoring where grant funds were spent was limited.

The Research Excellence Program is intended to fund the operating costs of research; consequently, program guidelines recommend that the costs of facilities and equipment not exceed 10% of a project's total direct costs. Also, to ensure that reasonable rates are charged for salaries and benefits, program guidelines limit the rates that should be charged according to the credentials of the researcher. We noted several instances where the Ministry approved projects that had estimated expenditures in these areas that exceeded guideline amounts, resulting in possible total ineligible program funding of over \$4 million.

RECOMMENDATION 7

To ensure that Research Excellence Program grants are used for the purposes intended and that project performance is effectively monitored, the Ministry of Research and Innovation should:

- implement a process to identify and follow up on projects that are not reporting quarterly as required;
- perform routine, formal monitoring visits to verify the information submitted by grant recipients, to ensure that program funds are being used for the approved research and that research milestones have been met; and
- develop clear guidelines for what independent audits are expected to accomplish and report, ensure that audit reports are received when due, and follow up on issues they identify on a timely basis.

MINISTRY RESPONSE

The Ontario Research Fund is a maturing program. The Ministry is committed to continually improving and refining the program's delivery model. The Ministry agrees that projects should be effectively monitored. To assist in this regard, the Ministry has recently completed the development of a contract-monitoring module for the Research Excellence program through the Research Awards Database, which captures key information for monitoring projects.

In addition, as part of the Ministry's 2008/09 Audit Plan, Internal Audit conducted an audit of two large program recipients to assess the effectiveness of the Ministry in monitoring the recipients; to assess whether the recipients have achieved contract deliverables; to verify that the expenses incurred are eligible under the contract; and to confirm that there is adequate supporting documentation in place. The results of this review will be used to help develop enhanced program-monitoring processes.

Research Infrastructure Program

The Research Infrastructure Program is a co-funded program delivered in partnership with the CFI. The program has approximately four staff to oversee and monitor 995 projects worth \$317 million. To avoid duplication of effort, the Ministry generally relies on the CFI to monitor research infrastructure grants.

Before making payments on a research infrastructure project, the Ministry reviews the payment request to ensure that the CFI has already made its related payment. The Ministry receives from the institutions a copy of the annual project reports and financial reports that the CFI requires to monitor project performance.

We were advised that the CFI conducts periodic visits to assess the adequacy and effectiveness of policies, processes, and financial controls, and

help to ensure that funds are being spent for their intended purposes. We were informed that the CFI also conducts contribution audits at the project level to ensure that the institutions have used the funds in accordance with the terms and conditions in the grant agreements and CFI guidelines and that private-sector contributions are valued correctly and milestones are being met.

The Ministry could request the results of the CFI's monitoring visits and audits for Research Infrastructure-funded projects. However, we found that it had not requested or received this information for Ontario's projects. Because the Ministry has not performed any of its own site visits, it is important to obtain such information to adequately assess whether further due diligence should be performed by ministry staff, or whether issues have been identified that affect the province. Also, we noted that the Ministry had no formal agreement with the CFI to clarify the roles and expectations of each of the funding parties and ensure the effective co-ordination of the oversight processes.

RECOMMENDATION 8

To more effectively monitor Research Infrastructure Program grants and ensure adequate co-ordination of oversight processes with the Canada Foundation for Innovation (CFI), the Ministry of Research and Innovation should:

- periodically obtain and review the CFI monitoring reports and audits for selected larger Ontario-funded projects to ensure that provincial funds are being used for their intended purpose and funded institutions comply with program policies and guidelines;
- assess the need for ministry staff to conduct site visits, especially on the larger projects; and
- establish a formal agreement with the CFI that clearly defines the roles and expectations of each party in the oversight processes for co-funded projects.

MINISTRY RESPONSE

The Ministry agrees that it would be helpful to work with the Canada Foundation for Innovation (CFI) to define a process for sharing information to facilitate oversight of co-funded projects. In particular, the Ministry will work with the CFI on selected larger Ontario-funded projects to ensure that provincial funds are being used for their intended purpose and funded institutions comply with program policies and guidelines.

PROGRAM ADMINISTRATION

The Ministry has approximately 15 full-time employees and five support staff dedicated to the administration and delivery of the Fund program. Since the inception of the program in 2004, the Ministry has paid out over \$300 million in transfer payment grants and committed a total of \$623 million to 1,066 projects. Financial and administrative controls are necessary to ensure that all of the program's significant policies have been complied with and public funds are used with due regard for economy. We reviewed the Ministry's financial and administrative controls over the program to determine if they were operating effectively and efficiently. We noted some areas where improvements could be made.

Information Systems

The Ministry uses a combination of spreadsheets, a database, and word-processing documents to manage Fund grants. The Research Award Database that the Ministry currently uses to manage grants has worked well as a repository for basic project information such as project description, funding amounts, and panel review assessments. However, the system is outdated and is not able to produce essential program-level and project-specific information needed to manage the growing volume and complexity of the 1,066

grants awarded to date. We found that, although the Research Infrastructure Program relies on the system to monitor grant payments for individual projects and the program as a whole, the Research Excellence Program does not. Also, the database does not capture key information for monitoring the performance of specific projects against contract terms, such as outstanding request for payments, due dates, and private-sector contributions. A contract-monitoring module is being built into the system to track project-specific information, but it is limited to the Research Excellence Program and, at the completion of our field work, was not yet operational.

The Ministry is developing a new e-grants system with a total estimated cost of \$2.9 million to help manage grants for all its research programs. The project is still in the planning phase; the new system is expected to be rolled out in April 2010 for another ministry program, but no date has been set for the Fund. In addition, the contract-monitoring component for the new system has not been designed, and as of March 31, 2009, the Ministry had not estimated the cost of this component.

RECOMMENDATION 9

To ensure that the Ministry of Research and Innovation has the information needed to effectively oversee its Ontario Research Fund program, its information system should provide ministry staff with timely program-level and project-specific information.

MINISTRY RESPONSE

The Ministry agrees that its information system should provide ministry staff with timely program-level and project-specific information. To accomplish this goal, the Ministry is developing an e-grants system. The e-grants system is a user-friendly and time-saving service-delivery and management tool that will automate the grant management processes and

align the Ministry with the Ontario Innovation Agenda. In addition, the e-grants system will offer improved access for applicants and offer ministry staff improved access to information to manage programs, including the Fund, more strategically.

Private-sector Partner Contributions

Meaningful participation in research programs by the private sector is often an indication that the research being carried out has commercial relevance and value to industry. The private sector's interest in the research may be in the form of cash or in-kind contributions. In-kind contributions include such items as equipment, materials, use of facilities, and research personnel. Cash contributions are more readily verifiable by the Ministry and could indicate a higher level of commitment for the commercial potential of research projects. As of March 31, 2009, approximately 60% (\$164 million) of the Research Excellence Program and 99% (\$156 million) of the Research Infrastructure Program private-sector contributions had been made in kind, as opposed to cash contributions.

Fair valuations of in-kind private-sector contributions are necessary to ensure that the Ministry is not contributing disproportionately to projects by matching contribution values that have been inflated. In its February 2004 meeting with the Standing Committee on Public Accounts, the Ministry stated that it would “develop policies to confirm contributions and ensure that there is independent valuation of in-kind contributions of a designated material value.”

We reviewed reported private-sector in-kind contributions of over \$65 million to determine whether the Ministry had established policies to ensure that contributions were properly valued. We found little evidence on file of independent evaluations to confirm that the actual value of in-kind contributions was equal to the value being

claimed by the contributor. For the Research Infrastructure Program, the Ministry relies on the CFI to ensure that reliable valuations are performed. For the Research Excellence Program, it follows the CFI's policy, which normally requires some form of independent third-party evaluation, depending on the type and value of the in-kind contributions. For example, the policy requires competitive quotes through a formal bid process or third-party appraisal for in-kind contributions of equipment greater than \$500,000. However, we noted several specific examples where there was no independent evidence on file to support the reported values. In one case, the equipment was valued at \$4.8 million. In another example, the private sector contributed \$18 million for facilities and equipment—but again, we found no independent evaluations on file to support the stated value of this in-kind contribution.

RECOMMENDATION 10

To provide assurance that in-kind private-sector contributions are fairly valued, the Ministry of Research and Innovation should:

- ensure that grant recipients comply with the policies adopted for the program to assess the value of in-kind contributions; and
- periodically verify that independent valuations of substantial in-kind contributions have been performed to support values reported by grant recipients.

MINISTRY RESPONSE

The Ministry, through the Fund, will continue to evaluate in-kind contributions from private-sector contributors in accordance with best practices established by peer-funding agencies. In addition, the Ministry will ensure that periodic verification of in-kind contributions is performed.