

NRC-CMRC

Evaluation of TRIUMF

Summary Report
March 14, 2019

Office of Audit and Evaluation



National Research
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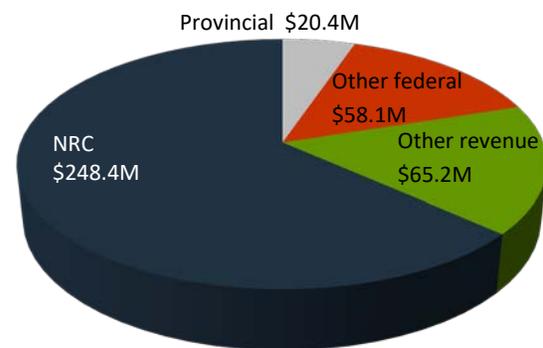
Background

TRIUMF is a particle accelerator laboratory conducting research in nuclear and particle physics, nuclear medicine as well as materials and accelerator science. These research areas require large-scale, expensive facilities for experimentation. As such, TRIUMF maintains unique scientific infrastructure which is accessed by members of the Canadian and international scientific communities. In addition, TRIUMF collaborates on international projects, which allows Canadian researchers access to international facilities.

TRIUMF receives operational funding from the federal government through a contribution agreement with the National Research Council (NRC). Therefore the NRC conducts an evaluation of TRIUMF every 5 years in compliance with requirements of the Financial Administration Act (Sec 42.1) and as per the NRC's approved Departmental Evaluation Plan

Financials

In addition to the operational funding from the NRC, TRIUMF's income comes from other federal departments, provincial governments as well as from income generated through investments and commercial revenues. Between 2013-14 and 2017-18, TRIUMF's income totaled \$392M.



Scope and methodology

The evaluation focused on the 5-year period of 2013-14 to 2017-18. Because the NRC's contribution is only one source of funding and there are no distinct outcomes associated solely with it, the evaluation considers the full slate of TRIUMF activities and outcomes. The evaluation's data collection approach incorporated both qualitative and quantitative methods including:

- a review of documents
- a review of administrative and performance data
- interviews with TRIUMF staff, clients, partners and other key stakeholders
- a survey of TRIUMF users
- an international peer review

A bibliometric analysis (commissioned by TRIUMF) and an economic and social impact assessment (commissioned by the NRC) were also completed by external consultants with the objective of informing the evaluation. Another important line of evidence for the evaluation is the international peer review. The International Peer Review Committee (IPRC) was made up of 7 individuals; 6 with expertise in each of TRIUMF's main research areas and one with expertise on commercialization. The IPRC assessed the scientific impact of TRIUMF and provided insight on the facility's strategic plan for 2020-2025.

Summary of findings

TRIUMF addresses the needs of Canadian scientists, is aligned with federal government priorities, and appropriately administered by the NRC

- TRIUMF serves the needs of a growing Canadian subatomic research community. The growth of this community increases the demand for facilities provided by TRIUMF. As a result, TRIUMF facilities are oversubscribed, limiting access.
- University researchers and students need the large scale facilities at TRIUMF because these are not available within their own institutions. The IPRC noted that TRIUMF enables Canadian universities to participate in the global research community at a much higher level than would be possible without a facility such as TRIUMF.
- Research needs could not be met in Canada in the absence of TRIUMF because it provides specialized infrastructure for research in nuclear physics, nuclear astrophysics and particle physics as well as other capabilities that not available elsewhere in Canada.
- TRIUMF aligns with federal government priorities in the area of science, technology and innovation. Alignment is demonstrated through iterations of the federal science and technology strategy as well as Budget 2017 and Budget 2018. TRIUMF also supports the NRC in its core responsibilities of advancing scientific and technological knowledge and growing innovative businesses.
- The NRC is well positioned to provide oversight to TRIUMF given its expertise in managing a large science laboratory; no other federal organization is more appropriately positioned to provide the oversight role.

TRIUMF has made important contributions to science and has generated social and economic benefits for Canada

- Through its outreach work and collaborative projects, as well as by providing researchers with the required facilities in which to conduct their research, TRIUMF has contributed to Canada's positive international reputation in TRIUMF related fields.
- The IPRC found that there are world-class efforts from TRIUMF in all areas in which they perform research. Further, despite its relatively small size compared to other international labs, a bibliometric study shows that TRIUMF is competitive in terms of publication output and impact.
- TRIUMF has played a role in international collaborations that have resulted in significant discoveries. TRIUMF's participation in such important projects is in part due to the infrastructure and the unique capabilities they offer. In addition, in its role as a facilitator, TRIUMF has been instrumental in connecting Canadian researchers to the world.
- TRIUMF prioritizes training of highly qualified personnel (HQP) and provides numerous training opportunities. Students affiliated with TRIUMF also benefit from the extensive facilities available at the laboratory which are not available elsewhere in Canada.
- TRIUMF not only develops HQP, but the existence of TRIUMF makes Canada an attractive place for them to remain following their training. Overall, the positive reputation in subatomic physics has made Canada an attractive place for researchers to work.
- TRIUMF has generated economic and social benefits for Canada as a result of its regular activities and through TRIUMF Innovations. The IPRC noted concentration of commercialization

activities in the life sciences and that 95% of royalty revenue was tied to one partnership and therefore recommended diversification to reduce risks. The IPRC also noted potential to expand outreach activities beyond British Columbia to increase reach and support from other provinces.

TRIUMF is committed to efficient and economic operations

- During the evaluation period, TRIUMF made many changes to improve efficiencies including putting in place a chief operating officer and a project management office. TRIUMF is also undergoing a significant exercise to transform its governance structure and many other changes throughout the organization are planned. The IPRC noted the need for communication about the changes to all staff and careful monitoring of the impact of these changes.
- TRIUMF has managed resources soundly. TRIUMF has secured increased funding from the NRC for work on the ARIEL project. While still representing a small portion of their total income, TRIUMF also saw an increase in revenue, which provides the facility with the capacity to support projects and initiatives not easily funded through public sources.
- TRIUMF has proposed a strategic plan for years 2020-2025 based on 3 key dimensions: science and technology, people and skills, and innovation and collaboration. The IPRC noted that the plan is aggressive but achievable at the requested budget and that it positions TRIUMF to produce ground-breaking results.
- Canada's current approach to funding creates challenges for TRIUMF as it does for other facilities. For TRIUMF, the uncoordinated funding approaches and cycles makes project planning and execution difficult, often because projects go beyond the timeframe of the funding. The issues associated with Canada's funding approach are widely recognized and steps toward improvement may come, in part from the federal government's implementation of the 2017 Science Review recommendations.

Recommendations and management response

Recommendation 1: The NRC should work with TRIUMF and TRIUMF Innovations to diversify commercialization activities (and to expand royalties and patents), to spread and reduce the risk associated with a too-narrow portfolio.

Management Response: Accepted

The NRC, through the Advisory Committee on TRIUMF (ACOT), will work with TRIUMF to identify how it can expand commercialization activities and develop metrics to measure progress. ACOT will provide this advice during the site visits conducted at TRIUMF twice per year and will include the advice and the progress against metrics, and recommendations in the ACOT reports submitted to the NRC.

Recommendation 2: The NRC should work with TRIUMF to identify ways to expand their outreach to regions outside of British Columbia, in an effort to increase both TRIUMF's impact and its base of support. Methods to broaden TRIUMF's reach could include virtual means.

Management Response: Accepted

The NRC, through the Advisory Committee on TRIUMF (ACOT), will review TRIUMF's plans for outreach, as outlined in the TRIUMF Implementation Plan 2020-2025 and identify additional opportunities for expanded outreach as appropriate.

ACOT will provide this advice during the site visits conducted at TRIUMF twice per year and will include the advice, and recommendations in the ACOT reports submitted to the NRC.

Recommendation 3: In order to facilitate understanding and buy-in by TRIUMF staff of planned organizational changes, the NRC should work with TRIUMF to develop and implement a plan for communicating the changes and their expected benefits.

Management Response: Accepted

The NRC, through ACOT, will provide TRIUMF with advice on the development and implementation of a plan for communicating upcoming organizational changes to TRIUMF staff. ACOT will provide this advice during the site visits it conducts at TRIUMF twice per year and will include its advice and recommendations in the ACOT reports submitted to the NRC.

Recommendation 4: The NRC should work with TRIUMF to identify metrics to monitor the implementation and impact of the organizational changes, to ensure outcomes are as expected, and to allow TRIUMF management to make slight changes as needed to achieve outcomes.

Management Response: Accepted

The NRC will work with TRIUMF to identify metrics to monitor the implementation and impact of organizational changes. These metrics will be included in the reports submitted by TRIUMF to the NRC as part of the ongoing monitoring of the contribution agreement (CA).