Science-Metrix

Tenth-Year Evaluation of the Canada Research Chairs Program

Final Evaluation Report

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Authors:
Michelle Picard-Aitken, M.Sc.
Trina Foster, Ph.D.
Isabelle Labrosse, M.Sc.
Julie Caruso, M.L.I.S.
David Campbell, M.Sc.
Eric Archambault, Ph.D.

Submitted to:
The Evaluation Advisory Committee of the Canada Research Chairs Program
Social Sciences and Humanities Research Council

By:

Science-Metrix Inc.
1335 Mont-Royal E. ▪ Montréal ▪ Québec ▪ Canada ▪ H2J 1Y6
1.514.495.6505 ▪ 1.800.299.8061
info@science-metrix.com ▪ www.science-metrix.com

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EXECUTIVE SUMMARY

In 2009, Science-Metrix was mandated by the Social Sciences and Humanities Research Council (SSHRC) of Canada on behalf of the Evaluation Advisory Committee of the Canada Research Chairs Program (CRCP) to perform the tenth-year evaluation of the program. The CRCP was created in 2000 to strengthen Canadian research performance in universities and position Canada among the world leaders in research. The program established 2,000 research chairs at eligible Canadian universities to help attract and retain some of the world's most accomplished and promising researchers.

Using multiple lines of evidence, including a document and file review, interviews, focus groups, web surveys, case studies, and a bibliometric analysis, five evaluation issues were examined: i) continued need and relevance; ii) success; iii) efficiency and effectiveness; iv) governance, design, and delivery of the program; and v) equity of the program for four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people). Overall, the evaluation found that the CRCP has been well implemented and continues to be relevant and effective. The full list of key findings, which follows this executive summary, supports the conclusions and recommendations of this evaluation, which are summarized here.

Continued Need and Relevance

The CRCP was identified as unique in Canada in terms of its objectives and the breadth and depth at which it operates, and it is well aligned with federal plans and priorities relating to research and innovation. These findings point to the relevance of the program and support the conclusion that there is a continued need for the CRCP.

Question 1: Is there a continued need for the CRCP?

The context in which the CRCP operates has undergone a number of changes since the program's inception in 2000. The most significant factor external to the program has been an increase in federal investments in research conducted at Canadian universities as part of the federal S&T Strategy, under which the CRCP is a key initiative. As a result of these investments, universities have observed marked increases in research funding and infrastructure, as well as a greater focus on research and strategic planning. Meanwhile, international competition remains strong in terms of R&D performance and the recruitment of world-class researchers, for which national competition has also increased.

The CRCP's four main objectives (which are i) to attract/retain leading researchers, ii) to increase the capacity of universities to produce and apply new knowledge, iii) to assist universities in developing comparative advantages in strategic areas of research, and iv) to contribute to the training of highly qualified personnel) remain relevant in light of these changes. In particular, the attraction and retention of leading researchers is an ongoing challenge for universities in the face of strong competition for research talent on both the national and global stages. Moreover, the objective to optimize the use of research resources through strategic planning, including infrastructure funded by the Canada Foundation for Innovation (CFI) component of the program, strongly aligns with ongoing efforts to enhance and build on research strengths to improve Canada's competitiveness in R&D. The CRCP is unique in Canada in terms of the objectives it strives to achieve and the scale on which it operates, and the strength of its model is supported by the fact that other countries have since implemented similar programs.

Question 2: With respect to the overall objectives of the CRCP, does there remain a role for the federal government to play? What is the

nature of this role?

The objectives of the CRCP are highly consistent with both past and current government plans and priorities relating to research and innovation, particularly the Government of Canada's S&T Strategy. The views of program stakeholders confirm that there remains a continued role for the federal government in the CRCP to support the creation of a strong knowledge-based economy.

Success of the CRCP

The evaluation demonstrates that the CRCP has achieved its four main objectives: i) to attract/retain leading researchers, ii) to increase the capacity of universities to produce and apply new knowledge, iii) to assist universities in developing comparative advantages in strategic areas of research, and iv) to contribute to the training of highly qualified personnel. Moreover, certain unexpected outcomes of the program have occurred, most notably in terms of the "star" status associated with CRCP Chairs, which can have both positive and negative effects on chairholders and non-CRCP faculty.

Question 3: To what extent have attraction and retention of leading/excellent researchers taken place?

The CRCP objective to attract and retain excellent researchers in Canadian universities is often regarded as the central issue behind the creation of the program. Overall, the findings show that the CRCP is a very well-regarded and effective tool for Canadian universities to attract and retain leading researchers, with the CFI contributing greatly to this outcome. Overall, 68% of CRCP chairholders originated from within Canada, and 32% came to—or returned to—Canada from international institutions. About half of the CRCP Chairs were used for retention.

Key barriers to attraction and retention of leading researchers relate to issues that reduce the ability of researchers to pursue a successful research program (e.g., lack of research infrastructure, research funding, or capacity to support students and research staff). The CRCP has helped to alleviate these barriers, especially by allowing universities to offer more appealing packages to researchers—notably through the CFI component (i.e., by providing otherwise unattainable levels of infrastructure support). More specifically, the CRCP has led to the attraction and retention of excellent researchers by enhancing or complementing the availability of research funding, the capacity to support students and research staff, and the quality of the research environment at the host university. The CRCP also confers both chairholders and host institutions with status and prestige. However, strong competition for leading researchers from both Canadian and international institutions suggests upcoming challenges for the CRCP in terms of continued attraction and retention of these researchers.

Question 4: What has been the CRCP's contribution to the capacity of universities to produce and apply new knowledge?

As leading or promising researchers in their respective fields, CRCP chairholders are expected to improve their institution's capacity to generate and apply new knowledge, which is one of the CRCP's four main goals. This evaluation concludes that chairholders, as a whole and compared with three comparable groups, truly are leaders or emerging leaders in their fields, producing and disseminating new knowledge that has had an impact in a number of spheres (e.g., health, policy, social, cultural, environmental). For example, the bibliometric analyses showed that CRCP chairholders produce a greater number of peer-reviewed papers, are cited more frequently, and are more often published in high-impact journals than comparable groups of leading researchers. Although Tier 1 chairholders often perform better than Tier 2 chairholders, this is expected based on their career status, and

Tier 2 chairholders often perform as well as or better than leading researchers in groups that include both junior and senior researchers. Beyond the publication of articles, CRCP chairholders also disseminate their research results via many other modes, including conference proceedings and posters, books and book chapters, patents, creative works, etc. In some cases, the knowledge generated by CRCP chairholders was more frequently reported to have been utilized (e.g., taken up or applied, including by external organizations) and/or to have generated impacts than that generated by comparable groups.

The extent to which this success can be related directly to the CRCP is difficult to quantify, as chairholders generally rely on multiple sources of funding and support beyond the CRCP; therefore, only partial attribution of outputs and impacts to the CRCP is possible. Compared with similar groups, however, chairholders are often more successful in obtaining additional research funds from both federal and outside sources. This also suggests that the CRCP's contribution to increasing the capacity of universities to produce and apply new knowledge may be primarily indirect (i.e., in helping to attract and retain these leading researchers and in conferring upon them recognition and prestige rather than in providing resources to chairholders). That being said, the CFI component of the CRCP—in allowing for the purchase and maintenance of state-of-the-art equipment, facilities and other infrastructure—was found to have a large direct impact on bolstering the chairholders' research capacity. Thus, while it may be difficult to quantify the exact contribution made by the CRCP, it is clear that the program has increased the capacity of universities to produce and apply new knowledge.

Question 5: To what extent has the CRCP contributed to universities developing a comparative advantage in strategic areas of research?

The objective of the CRCP "to optimize the use of research resources through strategic planning" requires universities to prepare a strategic research plan (SRP). The SRP maps out the universities' strategic areas of research with which CRCP Chair nominations must align, although the level of detail and breadth of these plans vary widely across institutions. There is ample evidence that the CRCP, through the attraction/retention of leading researchers and infrastructure improvements in particular, increased universities' research capacity in the designated strategic areas of research in multiple ways. For example, the CRCP was clearly associated with the creation and enhancement of research centres and clusters around chairholders; the CFI component has also played a crucial role in this regard.

Other ways in which the CRCP has contributed to the development of a comparative advantage for universities include the clustering of researchers in strategic areas to create a critical mass, the development of collaborative practices and opportunities, and the bolstering of Canada's international research reputation. While not all of these practices have been enhanced by the CRCP for all chairholders or all participating universities, researchers reported that national and international collaboration opportunities were more often enhanced by the CRCP than by other comparable chair programs. The impact of CRCP funding on collaborative practices was perceived most positively by Tier 1 chairholders, by those in the social sciences and humanities (SSH) disciplines, and by those in small and medium universities. Finally, the SRPs developed as a requirement of the CRCP are generally well regarded by university administrators and have even been used by some institutions outside of the context of the CRCP or the CFI.

Question 6: What has been the CRCP's contribution to the training of highly qualified personnel (HQP)?

The CRCP is expected to strengthen the training of HQP (including students and research staff), and the

evidence—including that collected from HQP themselves—confirms that this has occurred in several ways. In particular, large numbers of HQP were trained by CRCP chairholders, and the vast majority of HQP reported very beneficial experiences from working with chairholders. For example, HQP reported numerous professional and academic benefits resulting from the opportunity to work with CRCP chairholders, such as in the form of support, encouragement and training in knowledge dissemination via papers and conferences. As a whole, CRCP chairholders were often more available for HQP supervision and training, especially when teaching release was offered by their university, although the types of interaction between students and supervisors varied based on discipline and on the personal practices of individual chairholders. HQP and research staff also identified the CFI component as an important contribution to the attraction and training of HQP through the provision of world-class facilities and equipment. Moreover, the status and visibility conferred by the CRCP was seen to add value to the positive impacts experienced by HQP in terms of future collaborative and placement opportunities.

Several HQP remarked that their choice of supervisor and positive experiences with their chairholder had to do with the fact that these individuals were excellent researchers and mentors, not necessarily because they were CRCP chairholders. Nonetheless, the evidence cited above supports a direct link between the CRCP and enhanced benefits for HQP training, leading to their present and future success.

Question 7: Has the CRCP contributed to any unintended effects (either negative or positive)?

The CRCP was found to contribute to both positive and negative unintended effects, which is not surprising for a program of its scope that involves multiple organizations, covers a wide range of disciplines, and relies in part on its prestige and branding for its success. In terms of positive effects, the benefits related to the presence of chairholders on the research culture of certain universities was often noted, whereas the reputational or symbolic value associated with the CRCP provided an added value for the chairholders and those to whom they were directly linked (e.g., students, research staff and collaborators).

However, the "star" status associated with the Chair can have unintended negative impacts on non-CRCP faculty, such as decreased morale. Beyond not being able to benefit from the advantages of a CRCP Chair, there may also be unexpected repercussions on the reputation of unsuccessful CRCP Chair applicants, on chairholders whose renewal is not granted, or on leading researchers who are not offered a Chair, particularly if the rejection is based on alignment with strategic plans or administrative reasons rather than because of their research performance.

The CRCP can also have complex effects on the time allocation of chairholders, particularly given the variability with which it is implemented within and between universities. Indeed, while chairholders generally report an increase in time devoted to research activities (including for HQP supervision and training)—particularly when the university offers teaching or administrative release with the Chair—increased administrative tasks and additional responsibilities sometimes mean that chairholders actually have less time for research.

Efficiency and Effectiveness

Overall, the administration of the CRCP functions efficiently, and most adjustments made by the Canada Research Chairs (CRC) Secretariat over the lifecycle of the program have been appropriate and well received. Some suggestions for further adjustments could also be considered, such as to ensure that chairholders are able to maximize the potential of their Chair and to further increase the visibility and linking of chairholders.

Question 8: How could the CRCP be made more efficient while maintaining or increasing its level of effectiveness?

As the evaluation established that the CRCP met its four main objectives, the findings under this question focused primarily on aspects related to program efficiency, such as its application, review, and reporting processes. With regard to the program's administration, the processes of the CRCP were said to be well managed and efficient, with some effective improvements having been made during the lifecycle of the program. The evaluation did find that continued improvements and monitoring of these changes (e.g., those regarding intake dates and performance management) could help to further increase the program's efficiency. In cases where alternative modes of delivery of the CRCP (i.e., other than by the CRC Secretariat) were suggested, none were proposed that would support the program's strategic and capacity-building objectives, nor would they ensure that equivalent status was conferred to chairholders.

Although the program is effective as a whole, the evidence from various sources repeatedly pointed to a small proportion of chairholders—likely in the order of 10% to 15%—who do not maximize the potential of their Chair due to the fact that certain necessary elements required to conduct their research (e.g., research funding, infrastructure support/facilities from various sources) did not come together in a timely or sufficient manner. Because the CRCP, the CFI, federal granting agencies, and universities all contribute to delivering various key forms of support to chairholders, opportunities exist for these organizations to work more closely together to better understand, monitor, and determine appropriate ways to reduce the frequency of these cases and increase the program's effectiveness. Moreover, some stakeholders suggested ways to leverage the existing success of the CRCP by bringing together chairholders, their institutions, and their HQP. These CRCP-associated linkage opportunities would allow program beneficiaries to showcase their successes, share and learn from their experiences, and, more generally, increase the effectiveness of the program through enhanced visibility and networking.

Governance, Design, and Delivery

Overall, the CRCP's design is adequate and has contributed to the program's effectiveness in the previous 10 years. However, changes should be considered to ensure that the program continues to achieve continued success over the next stages of its lifecycle. In particular, the award amount, the issues posed by the current duration and single renewal of Tier 2 Chairs, the reallocation process, and aspects of the university-level implementation of the program were identified as potential elements for review to improve the program's effectiveness. Continued dissatisfaction with the proportion of Chairs allocated across disciplines suggests an additional design element for review.

Question 9: What are the impacts of program design elements on CRCP effectiveness?

The evidence collected as part of this evaluation supports the conclusion that the effectiveness of the CRCP in achieving its objectives is largely related to the alignment between its objectives and its design. Thus, the basic elements of the program's overall design should be retained. However, the findings suggest that, to ensure the continued and long-term success of the program, certain elements should be revised.

- Award amount: The amounts for Tier 1 and 2 Chairs have not changed since 2000. CRCP award funds—especially for Tier 2 Chairs—are being increasingly allocated by universities to chairholders' salaries (now, on average, 74% of the award), with a shrinking proportion being allocated to direct research costs (particularly student and staff salaries). The fixed award amounts limit the long-term attraction and retention

of excellent researchers, as well as further increases in the capacity of universities to produce and apply new knowledge via the CRCP.

- Tier system/duration: The two-tier system is appropriate for ensuring long-term capacity building. However, the fact that Tier 2 Chairs are offered for a maximum of two five-year terms (compared with unlimited seven-year terms for Tier 1 Chairs) is creating a gap between the career stages represented by the two tiers, resulting in short-term and long-term risks for the program. For example, evaluation informants at the program, university, and chairholder levels repeatedly raised concerns about potential problems with retention and strategic capacity building. Notably, it is likely that Tier 2 chairholders at the end of their second term will experience challenges (e.g., inability to access opportunities reserved for senior researchers, including Tier 1 Chairs) and dissatisfaction in transitioning to the next stage of their career (e.g., loss of advantages—financial or otherwise—associated with the Chair), which may result in their departure from the host university. The first 200 Tier 2 chairholders to reach the end of their second term will do so between now and December 2012.
- Reallocation process: The reallocation of Chairs among Canadian universities, which is calculated every two years, may be beneficial to universities that gain Chairs but is very disruptive to universities that lose Chairs (and to the chairholders who held the lost Chairs) and makes longer-term planning challenging. While recent adjustments to the "Chairs toolbox" have helped to alleviate some of the problems caused by this process, further measures to reduce the observed disruption—in particular, a mechanism to ensure that existing chairholders complete their Chair tenure even if their institution loses Chairs through the reallocation process—would improve the effectiveness of this process.
- University practices: The CRCP offers Canadian universities the flexibility to implement the program in a way that will best meet their particular needs and make the most strategic use of their Chairs (including via the selection of nominees and administration of award funds). However, some recurring issues are undermining the program's effectiveness and efficiency:
  - A lack of transparency in the nomination, recruitment and/or renewal processes was observed in some cases, which created resentment and fostered the perception that the institution's decisions with regard to CRCP candidates are driven by internal politics rather than justified by scientific/strategic criteria. The evaluation found that institutions using clear, transparent, and well-supported nomination/renewal practices promoted the success of chairholders and minimized the unintended impacts among non-CRCP faculty.
  - Wide variability can be seen in the additional support offered by universities to their CRCP chairholders. This support may take the form of additional funds (for 66% of chairholders, which is significantly higher than for comparable groups of researchers) or various types of in-kind support, which contributes to the success of CRCP chairholders. However, in some cases, CRCP chairholders reported not having received expected or sufficient support from their university to maximize the success of their research program. This variability, especially that regarding research and teaching release, has resulted in persistent frustration among some chairholders.
  - More generally, many chairholders expressed dissatisfaction with the variability in university-level implementation of the program, and some indicated that their Chair has not been adequately managed by universities. Chairholders have limited recourse and support from the CRCP in instances where they perceive that their original agreement and expectations have not been respected. While some universities have reportedly improved their internal management of the program over the past 10 years, if some current practices remain unchecked, their negative effects, even if relatively rare, threaten to

undermine the success of the entire program.

Question 10: What are the effects of the Chair allocation formula?

Since its inception, the CRCP has allocated the chairs in the following proportion: 20% in the SSH, 35% in the health sciences disciplines (via the Canadian Institutes of Health Research), and 45% in the natural sciences and engineering disciplines (NSE, via the Natural Sciences and Engineering Research Council). The fifth-year evaluation recommended revising the formula for allocation by discipline in light of dissatisfaction among the community with the proportion of Chairs allocated to the SSH, seeing that professors in these disciplines represent at least half of those in Canadian universities. In response, the CRC Steering Committee reaffirmed the rationale for the original allocation formula, which relates to "each discipline's ability to fund research and development," based on previous investments of the federal granting agencies.

Overall, the evaluation found that the achievement of program objectives is largely balanced across discipline areas, with certain benefits being reported more particularly in certain disciplines. For example, researchers in the SSH report more substantial structuring impacts in the form of collaborative practices and opportunities for HQP, whereas clinical scientists benefit in particular from unique access to salary support. However, the smaller proportion of CRCP Chairs in the SSH disciplines continues to create dissatisfaction among interested segments of the academic community: many evaluation participants still perceive that the current allocation system does not represent the number of SSH researchers in Canada, nor does it meet the need to enhance Canadian research capacity in SSH disciplines, particularly for institutions whose areas of strength and focus are in these disciplines.

Despite this perceived limitation to the current allocation system, the current formula based solely on granting agency funding at the university level (though somewhat circular) was generally found to support the CRCP's strategic and institution-focused objectives. Finally, the 120 Special Chairs were found to have allowed smaller Canadian universities to build capacity in their strategic research areas to an extent greater than originally expected, and there was a strong consensus for their continued need.

Systemic Barriers

The review of potential systemic barriers within the CRCP and of their effects for four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people) suggests that while some barriers exist, they are inherent to the academic environment. As such, the measures implemented by the CRCP to monitor equity issues are justified, and they are helping the CRCP to effectively address these issues in its design and delivery.

Question 11: Are there any systemic barriers in accessing the program by the four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people)?

The discussion on equity issues for the four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people) draws on evidence from the study on equity conducted as part of this evaluation, on the *Gender-Based and Diversity-Based Analysis* (2010) conducted by the Higher Education Strategy Associates, and on supplementary evidence from the web surveys and program data.

Systemic barriers have been observed in the CRCP that affect about 15% of researchers belonging to designated groups. The nature of these barriers is such that they are inherent to the academic environment, but the CRCP design is perceived to either exacerbate or insufficiently alleviate them. The main weakness in the program design with regard to these barriers appears to be the selection and nomination process as carried out by universities, a process over which the CRCP has limited control. However, signs do point to improved program access for women (especially for Tier 2 Chairs): the representation of women among all CRCP chairholders increased from 14% in 2001 to 25% in 2009. Nonetheless, women continue to be under-represented in some medium and large institutions, as are visible minorities. Sufficient data are not available to assess the representation of the other designated groups. Note that small universities each receive too few Chairs to expect them to be representative of the eligible research population and so are not considered here. Some evidence also points to a gender bias in terms of support that chairholders receive from their universities; this finding is relevant in the context of the need for universities to provide adequate support to ensure the success of CRCP Chairs.

In addition to previous adjustments in the program design, enhanced and ongoing monitoring, and periodic special studies, additional measures have been implemented by the CRCP to monitor and steer the nomination of chairholders at the university level in a manner that is representative of their current presence in higher education. Many measures are guided by the 2006 settlement agreement reached following a complaint brought to the Canadian Human Rights Commission in 2003 concerning the representation of the four designated groups among Chair recipients. This suite of measures is justified not only by the agreement but also by the findings reviewed as part of this evaluation, and it should help the CRCP to continue to more effectively address the issue of equity and systemic barriers within its design or in the delivery of the program. Additional efforts to redress these issues could align with greater oversight and intervention of the CRC Secretariat in the implementation of the program at the university level.

Recommendations

1. Revise and/or index the CRCP award amounts to ensure that the program can continue to effectively meet its objectives to attract and retain excellent researchers and to enhance the capacity of universities to produce and apply new knowledge.
2. Address the short-term and long-term risks and problems associated with the transition and retention of Tier 2 chairholders after the end of their second terms.
3. Provide the means to ensure that existing chairholders complete their Chair tenure, even if their institution loses Chairs through the reallocation process.
4. Reconsider the allocation formula to progressively increase the proportion of CRCP Chairs in SSH disciplines.
5. Provide advice and guidance to universities on best practices for CRCP implementation, and establish a formal, accessible, and open mechanism in order to assist chairholders' interactions with the CRCP and/or their universities in cases where there is a perception that the award is not being adequately managed (including during the nomination/renewal process and post-award administration).
6. Require that universities be more transparent in their Chair selection and renewal processes to both increase the success of chairholders and minimize unintended effects among non-CRCP faculty.

7. Ensure that all chairholders receive timely and adequate cross-organizational support for their research program.

List of Key Findings

Continued Need and Relevance

Success of the CRCP

Efficiency and Effectiveness

Governance, Design, and Delivery

Systemic Barriers

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ARC	average of relative citations
ARIF	average of relative impact factors
CERC	Canada Excellence Research Chairs
CIHR	Canadian Institutes of Health Research
CIMS	Chairs Information Management System
CFI	Canada Foundation for Innovation
CRC	Canada Research Chairs
CRCP	Canada Research Chairs Program
DCM	data collection matrix
EAC	Evaluation Advisory Committee
HQP	highly qualified personnel
IAC	Interdisciplinary Adjudication Committee
IC	Industry Canada
IESC	Interagency Evaluation Steering Committee
IOF	Infrastructure Operating Fund
IRC	Industrial Research Chair (NSERC program)
IRCI	International Research Chairs Initiative
NGO	non-governmental organization
NSERC	Natural Sciences and Engineering Research Council of Canada
NSE	natural sciences and engineering
R&D	research and development
RMAF	Results-based Management and Accountability Framework
S&T	science and technology
SRP	strategic research plan
SSH	social sciences and humanities
SSHRC	Social Sciences and Humanities Research Council

1.0 Introduction

Science-Metrix has been mandated by the Social Sciences and Humanities Research Council (SSHRC) of Canada on behalf of the Evaluation Advisory Committee of the Canada Research Chairs Program (CRCP) to perform the tenth-year evaluation of the CRCP. The present report presents the findings of this evaluation, as well as conclusions and recommendations that stem from these findings.

This introductory section of the evaluation report includes: background information on the CRCP (Section 1.1); a description of the CRCP's main characteristics, including its design and delivery, governance, and key beneficiaries, as well as the CRCP output and expected outcomes according to its logic model (Section 1.2); the objectives and scope of the evaluation (Section 1.3); and the evaluation questions (Section 1.4). The methods and data collection instruments are summarized in Section 1.5 (a more detailed description of methods is presented in Appendix A and a data collection matrix in Appendix B), and the challenges and limitations are presented in Section 1.6. The findings of this study are presented by evaluation question in Sections 2.0 to 6.0, with the conclusions and recommendations presented in Section 7.0.

1.1 The Context of the Canada Research Chair Program (CRCP)

The CRCP was created in 2000 to ensure that Canada would be well positioned to face the challenges and opportunities arising in the new millennium. This permanent program aims to strengthen Canadian research performance and to position Canada among the international leaders in order to maintain a dynamic economy, increase future job opportunities, and, ultimately, improve Canadians' quality of life. In short, research chairs are established in eligible Canadian universities to help attract and retain some of the world's most accomplished and promising researchers.

The CRCP is a tri-council program (i.e., SSHRC, the Natural Sciences and Engineering Research Council [NSERC], the Canadian Institutes of Health Research [CIHR]) and is under the aegis of these three agencies and Industry Canada (IC), in collaboration with the Canada Foundation for Innovation (CFI). The CRCP is aligned with the strategic outcomes of the three councils and is expected to play a prominent role in the Government of Canada's 2007 Science and Technology (S&T) Strategy, *Mobilizing Science and Technology to Canada's Advantage*. As a whole, these strategies aim to invest in people, discovery, and innovation for the benefit of Canadians. The consistency of CRCP objectives with government plans and priorities is examined in Section 2.2.

1.2 Characteristics of the CRCP

The principal objective of the program is to strengthen Canadian research performance in universities, as well as affiliated institutes and hospitals, in order to position Canada among the world leaders in research. To support Canada's research excellence and expand its research capacity, the CRCP aims to achieve the following specific objectives:

- to attract and retain excellent researchers in Canadian universities;
- to improve universities' capacity for generating and applying new knowledge;
- to strengthen the training of highly qualified personnel (HQP); and
- to optimize the use of research resources through strategic planning.

As such, the most direct beneficiaries of the CRCP are Canadian universities and their affiliates,

chairholders, and chairholders' trainees. In addition, Canadian industry, governments, non-profit organizations, and, ultimately, Canadian citizens may benefit from the research results and profit from new technologies, products, and treatments that increase their quality of life. Further details on immediate, intermediate, and final outcomes are presented alongside the logic model of the CRCP.

CRCP governance

The CRC Secretariat, which is housed within SSHRC, is responsible for the day-to-day administration of the program. It reports to the Management Committee, which itself reports to the CRC Steering Committee. In addition to playing an important role in the peer-review process, the CRC Steering Committee oversees the management of the program and provides strategic advice on the program's general direction. It is composed of the presidents of the three granting councils (CIHR, NSERC, and SSHRC), the president of the CFI, and the deputy minister of IC. The Management Committee provides guidance concerning the management of the peer-review process, communications strategies, and the program's structure, policy development, and budget management. It is composed of the executive director of the CRCP and the Vice-Presidents and Directors of the three agencies, the CFI, and IC.

Evaluation governance structure

The CRCP is governed by the general structure of interagency evaluations. This means that a larger number of stakeholders are involved compared with evaluations of most single-agency programs. Described herein are the stakeholder groups that have a direct influence on the evaluation protocol and execution of the evaluation project:

The **CRC Steering Committee** is mandated to supervise the administration process for the CRCP and provide guidance on the general direction of the program. Its responsibilities include overseeing the tri-agency Secretariat, reviewing Chair nominations, receiving financial and annual reports, and providing advice on surpluses and/or deficits. Evaluation activities are also part of its mandate.

The **Interagency Evaluation Steering Committee (IESC)** provides input from stakeholder organizations and expert advice and oversight to interagency evaluation projects. This structure is not specific to the CRCP; the IESC oversees evaluations of all interagency programs. Core membership of the IESC includes the heads of evaluation of the CIHR, NSERC, and SSHRC; a senior evaluation representative from IC; and observers from the Treasury Board of Canada Secretariat, Finance Canada, and IC's Program Coordination Branch. Interagency programs tend to be high-profile and materially significant and have been subject to scrutiny from Finance Canada and the Treasury Board Secretariat. Observer status on the IESC serves a dual purpose—to provide a venue for key audiences to receive information about tri-agency programs, and also for observers to contribute their expertise during IESC meetings with a view to increasing the effectiveness of evaluation projects.

The **Evaluation Manager** is a senior SSHRC evaluator and is responsible for managing the evaluation. The evaluation manager is responsible for day-to-day management of the evaluation and several other related tasks, such as reviewing the work of external evaluators and interacting with program managers as needed, managing evaluation risks, and ensuring effective communication flow between all parties.

The **Evaluation Advisory Committee (EAC)** includes evaluation specialists from the three granting agencies, CRCP staff, a representative from the CFI, and an evaluation representative from IC. The

EAC is chaired by the SSHRC Evaluation Manager and may undertake the following activities: participate in the selection of evaluators; provide advice, guidance, and validation on evaluation plans and products; review deliverables prior to submission to the IESC and to the CRC Steering Committee; review data collection tools and other evaluation instruments; provide feedback (including feedback from other agency representatives, if appropriate) in a timely manner; coordinate the provision of administrative data from each agency; and provide additional guidance as required and as appropriate.

CRCP budget

The federal government provided an initial budget of $900 million for the creation of the CRCP Chairs, and $300 per year since 2005. Between roughly $220 and $260 million are expended per year since 2005, leaving a surplus in the range of $28 to $44 million each year (Table I); this surplus is due in large part to the vacant chairs (discussed below). The CFI initially provided $250 million for infrastructure to support chairholders' research and continues to provide infrastructure funds via the Leaders Opportunity Fund.[1]

Table I CRCP Annual budget, 2005–2009

Period	Total budget	Frozen allotment	Administrative budget	Total paid	Surplus
2005–2006	$300,000,000	$46,000,000	$3,976,000	$221,639,302	$28,384,698
2006–2007	$300,000,000	$5,000,000	$3,976,000	$247,344,819	$43,679,181
2007–2008	$300,000,000	$0	$3,976,000	$258,608,484	$37,415,516
2008–2009	$300,000,000	$0	$3,976,000	$261,639,562	$34,384,438
2009–2010	$300,000,000	$0	$3,976,000	$259,263,374	$36,760,626

Source: CRC Secretariat

CRCP delivery

Canada Research Chairs are divided into two tiers. **Tier 1 Chairs** are tenable for seven years and renewable indefinitely. These are for outstanding researchers acknowledged by their peers as being world leaders in their fields. Tier 1 nominees must be full professors or associate professors who are expected to be promoted to the full professor level within one or two years of the nomination. Should they come from outside of academia, nominees must possess the necessary qualifications to be appointed at these levels. For each Tier 1 Chair, universities receive $200,000 annually for seven years.

Tier 2 Chairs are tenable for five years and renewable once. They are for exceptional emerging researchers, acknowledged by their peers as potential leaders in their field. Nominees for Tier 2 positions must be assistant or associate professors or possess the necessary qualifications to be appointed at these levels. Universities must justify why (e.g., clinical training, years in industry, breaks in career) a Tier 2 nominee is more than 10 years away from the highest degree at the time of nomination. For each Tier 2 Chair, universities receive $100,000 annually for five years.

[1] CRCP chairholders may also obtain funding through CFI programs not tied to CRCP; since the inception of the CRCP, 155 chairholders have done so.

Institutions that have received an average of $100,000 or more annually from the three federal agencies in the three years prior to the year of the allocation are eligible for regular Chairs. Chairs are distributed to universities in an alternating order: a Tier 2 is awarded first, followed by a Tier 1, followed by a Tier 2, etc. Every two years, the number of chairs allocated to eligible universities is recalculated and revised based on the level of financial support received from the three granting councils (NSERC, CIHR, and SSHRC) over the previous three years; this process is often referred to as the "reallocation" of the CRCP Chairs. Of the total 2,000 Chairs, 1,880 are regular allocations, distributed by discipline area as follows: NSERC 45%, CIHR 35%, and SSHRC 20% (Table II).

The program also sets aside a **special allocation** of 120 Chairs for universities that have received 1% or less of the total funding paid out by the three federal granting agencies over the three years prior to the year of the allocation. This is known as the "1% threshold." Unlike regular allocations, these Chairs are not allocated by area of research aligned with those of the granting agencies, and universities can choose the areas in which they would like to use the Chairs. Universities may also exchange one Tier 1 Chair for two Tier 2 Chairs, or two Tier 2 Chairs for one Tier 1 Chair, etc. To be eligible for a special Chair allocation, institutions must meet all three of the following criteria: 1) their total grant dollars from all three granting agencies must be less than the 1% threshold, 2) they must have received more than an average of $100,000 of grant dollars over the three fiscal years, and 3) they must have received less than 11 regular Chairs.

Table II Distribution of active CRCP Chairs across federal granting agencies and tiers

	No. of active Chairs*	% of Chairs within total % of Chairs within agency
TOTAL CRCP	1,799	100%
Tier 1 CRCP	764	42%
Tier 2 CRCP	1,035	58%
CIHR	586	33%
Tier 1 CIHR	267	46%
Tier 2 CIHR	319	54%
NSERC	820	46%
Tier 1 NSERC	346	42%
Tier 2 NSERC	474	58%
SSHRC	393	22%
Tier 1 SSHRC	151	38%
Tier 2 SSHRC	242	62%

Notes: *Chairs active in July 2009
Source: Compiled by Science-Metrix from the CRCP administrative database (CIMS)

Since 2005, a relatively constant number of the 2,000 total Chairs have remained vacant. Indeed, over the last five years, roughly 150 Chairs remain unfilled for a variety of reasons to do with the timing of Chair turnover. A Chair may be vacant for a certain amount of time (and often more than 18 months) if, for example, the chairholder resigns before the end of the term, if a Chair is not renewed, if a candidate declines the Chair after their successful nomination, or if a Chair nomination is not successful.

A university must submit a nomination to the CRC Secretariat for each Chair allocated to it. The nominee should be a researcher whose work complements its strategic research plan and who meets the program's high standards. All nominations are assessed against the following two criteria: 1) the quality of the nominee and the quality of the proposed research program, and 2) the quality of the institutional environment and commitment and fit of the proposed Chair with the university's strategic research plan. Universities may choose to include a request for infrastructure support from the CFI with their Chair nomination or request funding from the CFI for infrastructure shared by two or more Chairs. Note that the university is responsible for the administration of the funds for successful nominations. These are awarded directly to the institution (and not to the chairholders), who allocate the funds according to program guidelines on eligible expenses.

The program follows a peer-review process governed by the College of Reviewers and the Interdisciplinary Adjudication Committee (IAC). All nominations, whether they are for a new Chair or the renewal of a current Chair, are assessed by the College of Reviewers. The College of Reviewers comprises experts (including current chairholders) from a wide range of fields of research. For each Chair nomination, the CRC Secretariat selects three reviewers from the College of Reviewers to assess nominations and accompanying CFI infrastructure requests. Based on these assessments, the CRC Secretariat makes funding recommendations to the Steering Committee and to the CFI.[2] If the reviewers concur and their assessment is favourable, the CRC Secretariat makes a funding recommendation to the program's Steering Committee to support the Chair. In the case of nominations for researchers from abroad (foreign nationals or Canadian citizens) where peer review is unanimously favourable, the Executive Director of the CRCP has the authority to approve the recommendations. If any of the three assessments is not favourable, the nomination goes to the IAC, which then makes a recommendation to the CRCP Steering Committee on whether to support the nomination.

The IAC comprises 15 experts from the College of Reviewers. A superior record of research achievement, extensive experience, sound judgment, and proven ability to recognize excellence are the prime considerations in the selection of IAC members. As well, the membership of the IAC balances, as far as possible, language (English/French), gender, region, economic sector, academic discipline, and type of institution. The IAC reviews cases where any assessment was not favourable, as well as nominations that include a justification for a Tier 2 Chair.[3] The IAC also plays a major role in ensuring the consistency of standards across the program.

Equity

This evaluation comprises a comprehensive review on the issue of equity within the CRCP for women and members of the three other designated groups: members of visible minorities, persons with disabilities, and Aboriginal people (see Section 6.0). This is in response to an under-representation of

[2] Note that CFI approval is not automatically granted; applications are reviewed internally by CFI to make sure recommendations are well supported. If CFI judges it is not, it asks for a review by the Interdisciplinary Adjudication Committee (IAC). Finally, the CFI Board approves all recommendations. If a nomination is not recommended for a Chair, the accompanying request for infrastructure funding (if there was one) is automatically withdrawn.

[3] As of January 2010, a pre-screening process for Tier 2 justifications (i.e., before the submission of a nomination) is being implemented as a one-year pilot. As part of this pilot, universities may submit a Tier 2 justification package anytime throughout the year for review by the IAC.

women among CRCP nominees—especially in the earlier years of the program—and related concerns about access to the program by members of the other designated groups. The program is committed to ensuring access and opportunities to all qualified candidates, while maintaining standards of excellence. Ongoing collaboration between the CRC Secretariat and the universities has resulted in an increase in the proportion of female chairholders; as of January 2009, 25% of the chairs were allocated to women.

CRCP logic model

The logic model of the CRCP (Figure 1) links the program's activities to expected outcomes and to federal government priorities. Primary beneficiaries (universities, researchers, and HQP) are identified in the context of immediate outcomes. Secondary beneficiaries—that is, Canadian universities as a whole, industry, non-profit organizations, and the Canadian government—are associated with intermediate outcomes.

The outcomes of the CRCP are defined according to the timeframe in which they are expected to occur. Immediate outcomes principally involve changes in human resources and in the organization of research: the best researchers are selected based on the universities' strategic plans and the availability of Chairs, and HQP are hired and trained. Intermediate outcomes relate to the partnerships and networks created as a result of the program, which lead to increased inter- and intra-sectoral collaboration, all the while improving Canada's capacity to generate and apply new knowledge.

Within an intermediate timeframe, it is also expected that Chairs will lead to universities developing a comparative advantage in their areas of research and that the HQP pool will help to sustain high-level research in Canada. Final outcomes reflect the broad societal impacts of the CRCP and are generally captured at an aggregate level, with impacts stemming from other councils and government programs.

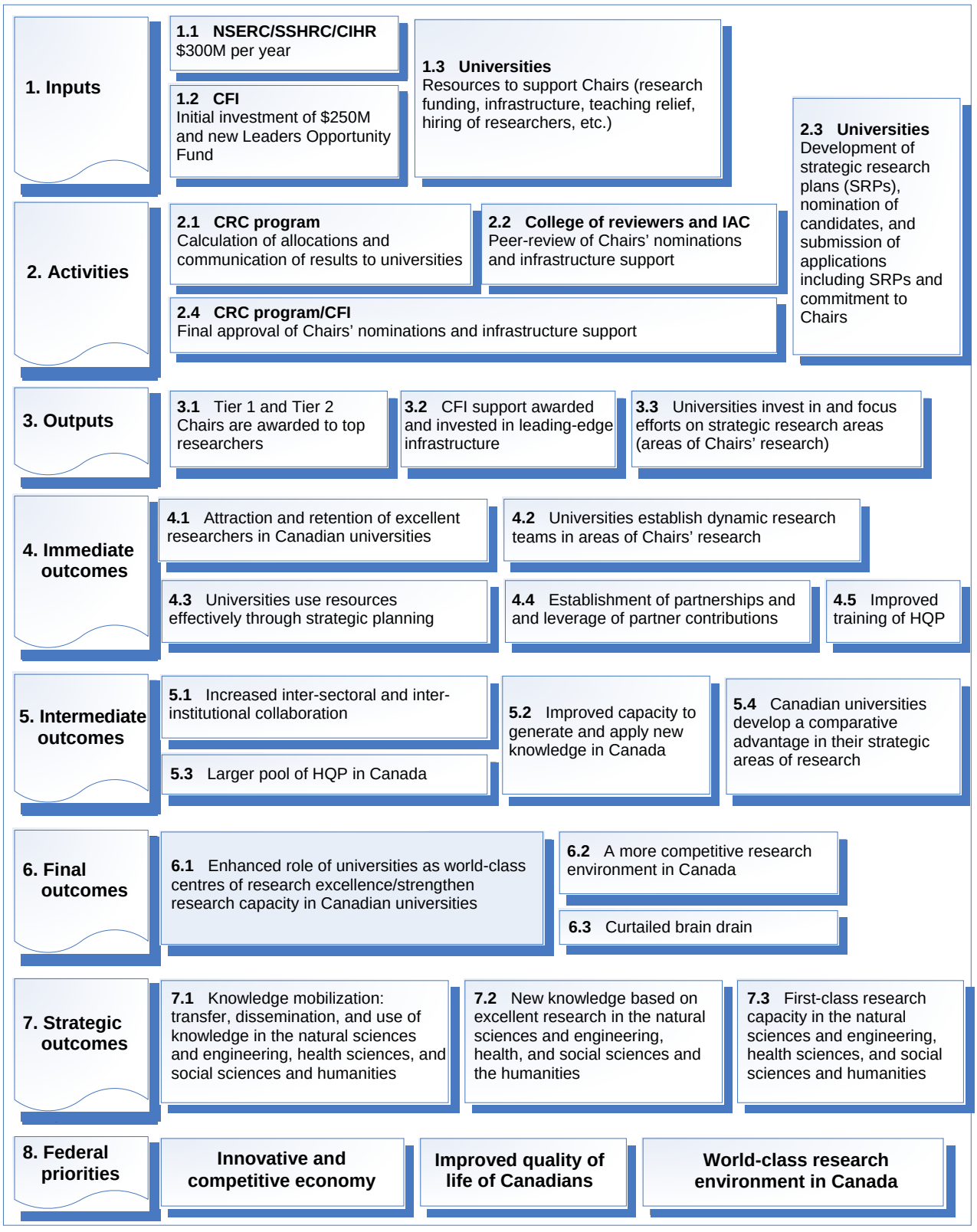

Figure 1 Logic model of the CRCP
Source: Canada Research Chairs Program

1.3 Objectives and Scope of the Evaluation

The summative evaluation of the CRCP covers the period from fiscal year 2000–2001 to fiscal year 2009–2010, but emphasis is placed on the last five years, as these have not yet been evaluated. Science-Metrix relied on key findings and recommendations provided in two previous evaluation reports (produced during the CRCP's third[4] and fifth years[5]) to maximize the benefits and cost-effectiveness of the present evaluation. A draft evaluation framework for this tenth-year evaluation was prepared by Goss Gilroy Inc.[6] Science-Metrix drew from that report to design the present evaluation, and elements of the evaluation method were further refined in view of the EAC's comments, as well as a group discussion with program-level representatives.

During the preparatory phase of the evaluation, consultations with stakeholders indicated that the most important factors to consider were the success of the CRCP in achieving its objectives and the extent to which the program has met stakeholders' needs and, ultimately, those of Canadians. This evaluation thus focuses on the following evaluation issues:

(i) continued need and relevance;

(ii) success;

(iii) efficiency and effectiveness;

(iv) governance, design, and delivery of the program; and

(v) equity of the program for the four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people).

1.4 Evaluation Issues and Questions

Questions pertaining to the five key evaluation issues (i.e., continued need and relevance; success; efficiency and effectiveness; governance, design, and delivery; and equity) were identified during the preparatory phase of this summative evaluation, with some subsequent adjustments. These questions were developed by Goss Gilroy Inc. based on consultations with CRCP stakeholders such as members of the CRC Secretariat, representatives of the three granting agencies, IC, Finance Canada, the CFI, the Association of Universities and Colleges of Canada, the Canadian Association of University Teachers, and chairholders. During this consultation process, respondents were asked to identify the most important issues for the forthcoming evaluation and to prioritize questions that should be addressed by the evaluation. The 11 issue-related evaluation questions are presented in Table III.

[4] Hickling Arthurs Low, 2002. *Third Year Review of the Canada Research Chairs Program.* See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/third_year_review_e.pdf

[5] R. A. Malatest & Associates Ltd., 2004. *Fifth-Year Evaluation of the Canada Research Chairs Program.* See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/fifth_year_review_e.pdf

[6] Goss Gilroy, 2009. Planning consultations for the Tenth-Year Evaluation of the CRCP, Final Report. Prepared for the Corporate Performance and Evaluation Division, Social Sciences and Humanities Research Council.

Table III Evaluation questions for the CRCP, by issue

Continued need and relevance	
Question 1.	Is there a continued need for the CRCP?
1.1	To what extent has the context in which the program operates changed since its inception? Changed since 2005?
1.2	Do the objectives of the program continue to be relevant given the changes in the program's context?
1.3	To what extent are there recent complementary or competing programs that are meeting similar needs for which the CRCP was designed to address?
Question 2.	With respect to the overall objectives of the CRCP, does there remain a role for the federal government to play? What is the nature of this role?
Success of the CRCP	
Question 3.	To what extent have attraction and retention of leading/excellent researchers taken place?
3.1	What are the barriers to attraction? Retention?
3.2	How has the CRCP contributed to or alleviated barriers to attraction and retention?
3.3	How has the CFI component contributed to attraction and retention?
Question 4.	What has been the CRCP's contribution to the capacity of universities to produce and apply new knowledge?
4.1	How has the CFI component contributed to the universities' capacity to produce and apply new knowledge?
Question 5.	To what extent has the CRCP contributed to universities developing a comparative advantage in strategic areas of research?
5.1	How has the requirement to develop strategic research plans (SRPs) assisted universities to develop a comparative advantage?
Question 6.	What has been the CRCP's contribution to the training of highly qualified personnel (HQP)?
6.1	Has the CRCP contributed to universities' capacity to attract and retain the highest-quality students from Canada and the world?
6.2	How has the CFI component contributed to the capacity to train HQP in collaboration with the CRCP?
Question 7.	Has the CRCP contributed to any unintended effects (either negative or positive)?
Efficiency and effectiveness	
Question 8.	How could the CRCP be made more efficient while maintaining or increasing its level of effectiveness?
8.1	Are there alternatives that would be more efficient, and would achieve the CRCP objectives?
Governance, design, and delivery	
Question 9.	What are the impacts of program design elements on CRCP effectiveness?
9.1	To what extent have university practices implementing the CRCP impacted the program's effectiveness (e.g., hiring practices, nominating procedures, renewal decisions, university support, use of funds)?
Question 10.	What are the effects of the Chair allocation formula?
10.1	Is the balance of Chairs by discipline adequate?
10.2	Is the formula based only on granting agency funding adequate?
10.3	What are the effects of the "Special Chairs" allocation? Is there a need to continue to allocate them? How should they be allocated?
Systemic Barriers	
Question 11.	Are there any systemic barriers in accessing the program by the four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people)?

1.5 Methods

This evaluation uses multiple lines of evidence and indicators to examine the evaluation questions. These were mapped in a data collection matrix (DCM, in Appendix B), and the collected data were organized into an evidence table to prepare for the meta-analysis. The following methods were used during the data collection phase: 1) document/literature and CRCP file review, combined with review and analysis of administrative data; 2) 106 interviews; 3) four HQP focus groups; and 4) four web surveys. Moreover, higher-level analyses—19 case studies and a bibliometric analysis—made use of collected data, as did a study on equity issues. The last phase of the evaluation, i.e., the meta-analysis, synthesis, and writing of the evaluation report, drew on all of the data collected during the previous phases of the evaluation in order to address the evaluation issues and related questions (Table III). Table IV presents an overview of the data collection methods used and the range of evaluation informants consulted, while Figure 9 (in Appendix A, Methods) shows how the methodological instruments relate to one another and to the main phases of the evaluation. Additional details on the methodological approach are presented in Appendix A.

Table IV Overview of data collection and analytical methods

Data Collection Method*	Details
1. Document and file review	The review of documents, secondary literature, files, and program data included: • CRCP documents, past evaluations/reviews, and administrative data (CIMS) • CRCP Chair reports (annual university and chairholder reports and financial reports) • Departmental documents (CIHR, NSERC, SSHRC, CFI, and IC) and governmental documents • Documents related to non-CRCP chairs and other relevant documentation and literature
2. Interviews	Total number of interviews ..... 106 • Program-level key informant interviews (1–6 interviewees per interview) ..... 10 • Chair-level interviews (three groups) ..... 12 • Case study interviews (for 19 case studies) ..... 52 • Equity-related interviews with members of four designated groups 32
3. Focus groups with HQP	Total number of focus groups (Fredericton, Montréal, Toronto, Vancouver) ..... 4 Total number of participants 34
4. Web surveys	Total number of completed responses (valid response rate†, margin of error‡): • Survey of CRCP chairholders ..... 1,009 (55.8%, 2.1%) • Survey of other chairholders (excluding federal granting agency chairs) ..... 173 (29.3%, 6.3%) • Survey of grantees (not CRCP chairholders) ..... 172 (29.0%, 6.3%) • Survey of university VPs Research 44 (60.3%, 9.4%)
Analytical Method	**Details**
Case studies	Total number of case studies: ..... 19 • 14 CRCP Chairs, 2 non-renewed Chairs, 3 non-awarded Chair applications
Bibliometric analysis	a) Analysis of the scientific performance of CRCP chairholders compared with three groups: • a group of unsuccessful CRCP applicants • a group of other chairholders (matched; excluding federal granting agency chairs) • a group of grantees (matched; not CRCP chairholders) b) Pre-post analysis of the output of CRCP chairholders to assess the effect of the CRCP on their scientific performance

Notes: * The methodological approach is presented in more detail in Appendix A, Methods.
† Valid response rate = Number of completed surveys, divided by the valid sample, which excludes unreachable potential respondents.

‡ 95% confidence level (19 times out of 20).

1.6 Evaluation Challenges/Limitations

Most of the challenges and limitations that arose during the course of this evaluation are those inherent to evaluation projects generally, such as limitations associated with the methods that were used (e.g., interviews, surveys, case studies, review of program data). These challenges and limitations were mitigated to a large extent by experienced evaluators—both at Science-Metrix and SSHRC—using best practices in evaluation and project management, including using multiple lines of evidence to support findings, internal verifications, regular progress reports, and revisions to the project planning and schedule (when necessary). It is worth noting that certain limitations associated with the web surveys, scientometric analysis, and case studies were beyond the direct control of the evaluation team. These issues, which had a direct impact on the analyses that were used to inform this evaluation, are discussed below and, when relevant, in the results sections of this report.

Complexity and diversity: As in every complex evaluation, stakeholders from various organizations have inherent biases and may have equally varied opinions; sometimes these are in relatively strong opposition with one another. Likewise, successful recipients of research grants are generally more positive than unsuccessful applicants. Though one cannot always draw adequate conclusions when confronted with opposing or diverging views of such stakeholders, evaluators know that strong evidence has been obtained when they are in agreement.

Web surveys: Limitations associated with web surveys primarily relate to issues with the sample population (i.e., small populations of university VPs Research, grantees, and other chairholders) and with the comparability of the three surveyed populations of researchers (CRCP chairholders, other chairholders, and grantees). The other chairholders survey population represents a sample of researchers in Canada who hold a research chair or a similar career award from instances other than the federal granting agencies (e.g., excludes IRCs), whereas the grantees survey population were identified among researchers funded by the federal granting agencies who have never received a CRCP Chair or another kind of chair or career award but who are otherwise comparable to CRCP chairholders based on their grant amounts received (see Appendix A, Methods). Because these three populations of researchers were not completely comparable in size, discipline, and geographic distribution, the results of the comparisons conducted between these groups should be interpreted with care. The small population size for the VPs Research survey also resulted in a relatively large margin of error for this survey, which considerably limited the scope of the analysis that could be conducted; whenever possible, complementary data from other data collection methods (e.g., interviews) were used to confirm the findings from this group.

Case studies: Key challenges for the case studies arose in the selection of the 19 cases, which were required to meet the selection criteria (as outlined in Appendix A, Methods) and for which academic researchers, VPs Research, and HQP had to be willing and available to participate in interviews. Three to four chairholders, comparable in their selection criteria, were planned for each case study in expectation that some of them would decline to participate. With one exception, all case studies were conducted on Chairs in the initial sample; the remaining case was selected based on the same selection criteria, so this should not affect the validity of the conclusions. However, an error in the selection process resulted in a smaller number of cases without CFI support than originally planned, which limited the use of the case studies to demonstrate the impact of the CFI component; other sources of

evidence were therefore relied upon more strongly for this purpose. Notably, there were also sizeable variations in the depth of information provided by VPs Research in the case studies, as several of them were not present when chairholders were nominated. Moreover, in many universities, the VPs Research are not involved in the selection and evaluation of CRCP Chairs, and their knowledge of the cases under study was consequently limited. Additional informants were occasionally consulted within the case study data collection process to obtain a greater understanding of these aspects of the implementation of the CRCP within their institution, but this did limit to a moderate extent the use of the case studies to examine these processes.

Bibliometric analysis: The limitations of the bibliometric assessment are primarily associated with variations among the discipline areas covered by the CRCP and database coverage. Indeed, bibliometric databases (including Scopus, which was used here) favour English publications. The coverage of SSH research is impeded by the fact that researchers in SSH tend to publish in books, in local journals that are not necessarily covered by the database, and in their own language (which might limit the coverage of SSH researchers in Quebec and that of other French Canadians).[7, 8] To ensure the comparability of the groups of researchers that were examined, matched samples were prepared based on the available information (i.e., discipline area, institution size, career status). The other chairholders population represents a sample of the researchers in Canada who hold a research chair or a similar career award from instances other than the federal granting agencies (e.g., excludes IRCs), whereas the grantees sample population were identified among researchers funded by the federal granting agencies who have never received a CRCP Chair or another kind of chair or career award but who are otherwise comparable to CRCP chairholders based on their grant amounts received (see Appendix A, Methods). Note that the sample population of other chairholders and grantees examined as part of the bibliometric analysis do not necessarily comprise the same individuals from these groups who answered the web surveys, and vice versa.

[7] Archambault, É., Vignola Gagné, É., Côté, G., Larivière, V., and Gingras, Y., 2006. Benchmarking scientific output in the social sciences and humanities: The limits of existing databases, *Scientometrics*, 68(3): 329–342.

[8] Archambault, É., and Larivière, V., 2010. The limits of bibliometrics for the analysis of the social science and humanities literature, in *World Social Science Report. Knowledge Divides*. Paris: UNESCO Publishing and International Social Science Council, pp. 251–254.

2.0 Findings — Continued Need and Relevance

2.1 Question 1: Is there a continued need for the CRCP?

Question 1.1: To what extent has the context in which the program operates changed since its inception? Changed since 2005?

This tenth-year evaluation of the CRCP offers an in-depth review of the context in which the CRCP operates was conducted, with a focus on changes since 2005 (i.e., since the fifth-year evaluation of the program). Both program documents and external studies were consulted, and the views of program- and university-level interviewees were collected. All of these sources confirm a number of important changes that affect the external context in which the program operates, especially increased investment in research conducted in Canadian universities, and the restructuring effect these investments have had on their research environment. Competitiveness between Canadian universities and with foreign universities continues to increase, including for leading researchers. Some changes were also observed within the program itself during the period, such as an increased focus on performance measurement and accountability with greater consideration given to equity issues, as well as continued adjustments to the delivery of the program.

External changes

Changes external to the CRCP mainly related to shifts in Canada's higher education policy toward far greater direct involvement of the Canadian government in the support of university-based research. The late 1990s and the early 2000s saw the formal launch of Canada's Innovation Strategy, under which a complement of government programs and policies were created. These reflected a new commitment to enhancing the national state of knowledge production and innovation and increasing Canada's contributions to the global knowledge economy. The Innovation Strategy thus included a major influx of federal investment in the direct and indirect costs of research conducted within universities, including funding for training programs, research infrastructure, and the country's federal granting agencies (i.e., NSERC, SSHRC, and CIHR, which was established in 2000). Major initiatives included the creation of the CFI in 1997, the Indirect Costs of Research program in 2003, and the CRCP in 2000. These efforts have been accompanied by an enhanced awareness of the importance of research and innovation to Canadians' economic and social well-being and quality of life. Since 2005, the focus on a strategic, priority-based approach to ensuring the country's international competitiveness has also become more explicit (e.g., Canada's 2007 S&T Strategy).

Canada continues to face fierce competition on a global scale, both in terms of its R&D performance and with regard to its highly skilled workforce. Countries such as China, India, Russia, and Brazil have moved into the S&T arena and, while it is clear that Canada has strengthened its research and knowledge base in the last 10 years, these advances have not yet fully been translated into expected impacts.[9] Nonetheless, evaluation informants at both the program and university levels agree that Canada is much better positioned with regard to research, nationally and internationally, than it was 10 years ago. Moreover, concerns about "brain drain" (i.e., losses in Canada's skilled workforce) have

[9] See, for example: Conference Board of Canada, 2010. *How Canada Performs: A Report Card on Canada*: http://www.conferenceboard.ca/HCP/default.aspx; Science-Metrix, 2006. *Scientific and Technological Positioning of Canada Strengths Using Scientometric and Technometric Data*. Prepared and submitted to the Council of Canadian Academies.

become less prominent in the last five years, but competition for leading researchers has continued to increase, such that the maintenance of a critical mass of individuals with advanced qualifications remains crucial (see also Questions 1.2 and 1.3, below).

Canadian universities, as direct beneficiaries of many of the new research-focused programs created by the Government of Canada, have noted important changes in their research environment over the past 10 years. For example, in the web survey, VPs Research were nearly unanimous in noting an intensification of research within their institutions relating to increased funding for research activities, more and better quality research infrastructure via the CFI program, and a greater number of researchers within the university's research centres. Many of the new federal programs are also meant to act in complementary ways, requiring a greater level of strategic planning on the part of universities, as well as greater accountability and performance measurement to justify their research efforts and expenditures. Concurrently, all VPs Research noted a strong increase in competitiveness among Canadian universities, particularly for the recruitment of promising and high-calibre researchers and in research fields identified by the federal government or by universities as strategic S&T priorities. Competition was also perceived to have increased, albeit to a lesser extent, between Canadian and foreign universities, and some VPs took this opportunity to note that the salaries of world-class researchers have also increased significantly in the last 10 years.

Relative to the CRCP, perhaps the most interesting change seen within Canadian universities is an increased expectation that university professors conduct research, including applied research, and the status associated with such activities. For example, some program-level interviewees and VPs Research from universities of a wide range of sizes observed an increased emphasis on research for promotion and tenure, as well as a shift toward interdisciplinary and collaborative research, including collaboration with other sectors (i.e., government, industry). Related to this, and noted by several informants, is the rise of academic or research "stars" in Canada, which is associated with increased visibility, intellectual authority, and prestige. All of these changes have also increased the pressure on researchers to "do it all" (i.e., research, teaching, collaboration, dissemination, knowledge transfer, etc.), which VPs Research and the researchers themselves noted as having both positive and negative impacts on the research environment and on faculty members.

Changes within the CRCP

The context internal to the CRCP itself has not been static in the past decade, although the key elements of program governance have remained stable (see Section 1.2), which is likely to have facilitated the successful delivery of the program. The main observed changes relate to an increased focus on performance measurement and risk management, which is a reflection of the growing pan-governmental focus on accountability during the lifecycle of the program. In response to recommendations made in the third-year evaluation of the program,[10] as well as due to the high visibility of the program and the large investment it represents, the CRC Secretariat has since implemented a suite of performance measurement measures, including annual reports, exit forms, and periodic special studies. The program also developed a fully integrated Results-based Management and Accountability Framework (RMAF) and Results-Based Audit Framework (RBAF) in 2006, and aimed

[10] Hickling Arthurs Low, 2002. *Third Year Review of the Canada Research Chairs Program*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/third_year_review_e.pdf

to increase its budgetary allocation for performance measurement and evaluation, from $100,000 in 2005–2006 to $140,000 in 2008–2009,[11] to support various performance measurement activities.

The CRC Secretariat has also been involved in two related initiatives. First, the International Research Chairs Initiative (IRCI) was developed in 2007 in partnership with the International Development Research Centre. The IRCI supports up to five Chairs in universities in eligible countries (i.e., outside of Canada) to "build university research capacity and international research linkages." Second, the Canada Excellence Research Chairs (CERC) program was established by the CRC Secretariat in 2008. In May of 2010, the first 19 Chairs—worth up to $10 million over seven years—were awarded.

Considering its visibility, budget, and impact, it is not surprising that the CRCP has been subject to a high degree of scrutiny. The CRCP has received criticism from a number of quarters within Canada, particularly in its earliest years, on aspects of its design that were seen to result in critical imbalances and exacerbate equity issues for certain groups. The program has also undergone two previous evaluations, each of which made a relatively large number of recommendations. Many notable changes in the CRCP's internal operating procedures have therefore resulted from these recommendations, from external pressures from stakeholders, and in response to feedback from participating universities and chairholders. Two of most notable changes that occurred within the context of the CRCP are:

- **Flexibility:** The introduction of a "corridor of flexibility," which allowed universities to fill a specified number of unused Chairs using any combination of tier and in any discipline group, thereby creating "flexible Chairs." The fifth-year evaluation reported that this corridor of flexibility had improved the ability of universities to create Chairs, and further adjustments have been made to the number of "flexible Chairs" a university can have based on its number of allocated Chairs.[12]
- **Equity:** Concerns were raised repeatedly in the first five years of the CRCP that the program led to systemic discrimination (including a formal complaint lodged by eight professors from across Canada), particularly with regard to gender equity. The CRC Secretariat has since implemented a series of measures to continue to "monitor gender-balance issues, including ongoing annual monitoring and periodic special studies" and to begin "holding universities accountable for meeting gender distribution targets."[13] Since 2000, the proportion of female chairholders has increased from 14% to 25%. Section 6.1 presents an in-depth discussion of equity issues.

It should also be noted that some criticism of the CRCP has also focused on the fact that 20% of the Chairs are allocated to researchers in social science and humanities (SSH) disciplines—despite their representation of at least half of Canadian faculty—with many claiming that the program design therefore harbours a bias toward the physical, medical, and natural sciences. For example, in 2005, the Canadian Federation for the Humanities and Social Sciences called for greater equity in the allocation formula by discipline and an overall greater allocation of funds to the SSH disciplines. The fifth-year

[11] The estimated amount for 2009–2010 is $260,000 but includes the cost of the present evaluation. Canada Research Chairs, 2006. *Integrated Results-based Management and Accountability Framework and Risk-Based Audit Framework*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/rmaf_e.pdf

[12] R. A. Malatest & Associates Ltd., 2004. *Fifth-Year Evaluation of the Canada Research Chairs Program*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/fifth_year_review_e.pdf

[13] Canada Research Chairs, 2005. *Response to the Fifth-Year Evaluation of the Canada Research Chairs Program*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/fifth_year_response_e.pdf

evaluation of the CRCP recommended revisiting the allocation formula by discipline area, to which the Steering Committee indicated that the allocation method was part of the original program design and the decision on this point rests with them; should they decide to make any changes, this would require Cabinet approval. Therefore, the original allocation formula remains, with the SSH disciplines receiving 20% of the total allocation of Chairs. A comprehensive discussion of evidence relating to the allocation of CRCP Chairs according the formula by discipline area is provided in Section 5.2.

Question 1.2: Do the objectives of the program continue to be relevant given the changes in the program's context?

As presented in Section 1.2, the CRCP aims to achieve the following specific objectives: to attract and retain excellent researchers in Canadian universities; to improve universities' capacity for generating and applying new knowledge; to strengthen the training of highly qualified personnel (HQP); and to optimize the use of research resources through strategic planning. Overall, evaluation informants at all levels confirmed the continued relevance and need for the CRCP, indicating that not only is the program still relevant in the current context, but also that it is crucial to maintaining the gains that the program has achieved over the past 10 years. Indeed, the program (including the CFI component) was perceived as having strongly contributed to the key changes in the research environment in Canadian universities described under Question 1.1, and so was also said repeatedly to be crucial to the maintenance, enhancement, and long-term benefits of the improvements acquired thus far. The fact that other countries have implemented a similar program (see Question 1.3) also implies that Canada should maintain the CRCP to ensure that it remains competitive at the world level.

Attraction and retention of leading researchers

One of the key defining issues to have shaped the CRCP is the attraction and retention of leading researchers in Canadian universities. Seeing the continued international competitiveness for the recruitment of promising and top-calibre researchers, the program has been and continues to be seen as one of the country's primary mechanisms to build this specific workforce and to mitigate the continued threat of losses of excellent researchers to other countries. Evaluation informants at all levels see the recruitment and retention of talent, as well as the development of faculty and research capacity in a strategic manner, as one of the main successes of the program—which is strongly supported by the findings of this evaluation (see Section 2.1)—and as something that must be maintained. In fact, certain interviewees took the discussion about the program's objectives as an opportunity to express concerns that the effectiveness of the CRCP in this regard might be waning (see Section 5.1).

Improvement of the capacity of universities to generate and apply new knowledge

When asked about the continued relevance of this objective, many evaluation informants pointed out that the attraction of high-calibre researchers constituted a means in itself to improve the research capacity of universities. Most also praised the combination of the CRCP and the CFI, which act in synergy to improve the research infrastructure and environment of both chairholders and their universities (see also Section 3.2, Question 4.1). Others pointed to specific benefits acquired by the CRCP for certain types of researchers, often highlighting that the CRCP was flexible enough to support the research program of researchers at different points in their career and in multiple disciplines. Moreover, VPs Research from smaller universities feel that the program has revitalized the research

culture within their institution, and they, along with research-intensive universities, perceive the program as a way to attract new research funding.

Indeed, chairholders are generally successful at leveraging research funds and the provision of even a small amount of stable research support for a period of five or seven years has allowed some chairholders to envision large-scale or longer-term studies (see Section 3.2). Moreover, there is considerable indirect value of the CRCP, namely the status and prestige that is associated with it, which sends a clear message that Canada recognizes that the research being conducted by chairholders has value and is of good quality. This is perceived to increase the uptake and impact of chairholders' research (see Section 3.2). Thus, as Figure 5 shows, universities currently allocate about 73% of CRCP funds to support chairholders' salaries (this does not include associated CFI funds), so that relatively limited amounts are ultimately used for research; nonetheless, improving the research capacity of universities remains relevant in the wider context of the program. Strengthen the training of HQP

There is ample evidence based on the views of evaluation informants and on current government priorities (see Section 2.2) that the objective to strengthen the training of HQP remains very relevant within the context of a knowledge-based economy. Indeed, the presence of leading researchers and the increased research capacity of universities that is enabled through the CRCP have created opportunities for increased training of HQP under the supervision of excellent researchers, i.e., the CRCP chairholders, which provides added value to their skill set (see Section 3.4).

Optimize the use of research resources through strategic planning

Jointly with the attraction and retention of excellent researchers, the objective to optimize the use of research resources through strategic planning is seen by many evaluation informants at various levels as one of the key elements that supports the current relevance of the program. The CRCP was created during a period when the federal government was focused on a brand new Innovation Strategy, to which the rationale for its creation was strongly linked. This, as noted by Polster,[14] meant that the CRCP was "designed to promote changes" that would lead to Canada's prominence within the global knowledge-based economy. Given that a fundamental aim of the program has been to transform the face of Canadian academic research, the program is also inherently different in design, scale, and scope from other federal granting council programs.

Ten years later, the focus on the strategic approach to R&D has only increased (see Question 1.1), and the CRCP continues to be centrally positioned within Canada's S&T Strategy (see Section 2.2). Many evaluation informants, especially those at the program level, therefore see the strategic aspect of the CRCP (including the associated CFI component) as being the most relevant in the current context. For example, they point out that the CRCP has provided Canadian universities with an effective tool to enable them to manage and direct their research capacity building—including faculty, infrastructure improvements, external funding, and training opportunities—in a way that places the strategic considerations at the centre of the process. A number of other informants have suggested that the concept of building or enhancing areas of research strength within universities has naturally aligned

[14] Polster, C., 2002. A break from the past: Impact and implications of the Canada Foundation for Innovation and the Canada Research Chairs Initiative, *CRSA/RCSA*, 39(3), 275–299.

with and led to greater collaboration and interdisciplinary and inter-sectoral partnerships, including in areas where these were less prevalent previously (see Section 3.3).

Note that this last CRCP objective has undergone some changes since the beginning of the program. In addition to favouring the optimal use of research resources through strategic planning, an initial goal was to accomplish this through "inter-institutional and inter-sectoral collaboration, as appropriate." The importance of this aspect has been debated, with the five-year program evaluation concluding that the CRCP should revisit this element of the objective. In response to this recommendation, the CRCP, while noting the continued importance of the collaboration element, changed the objective's wording. No evidence of issues with the objective as currently worded was found.

Responsiveness to program stakeholder needs

None of the program-level interviewees raised notable concerns in terms of the responsiveness of the CRCP to the needs of their organizations (i.e., federal granting agencies, Industry Canada) or their beneficiaries more generally. Perhaps the only comment made in this regard was that the CRCP cannot meet its objectives in the absence of sufficient funding for research (i.e., research grants, such as those administered by the federal granting agencies).

At the university level, VPs Research mostly agreed that, given the current research environment, the CRCP responded to their university's needs to a great or large extent (73%), while 23% felt it responded to a moderate extent and 5% to a small extent. With regard to individual CRCP objectives, about 90% of the VPs Research survey respondents indicated that they were "quite relevant" or "very relevant." When asked to explain their ratings, VPs Research who gave more positive assessments of the program focused on the "enabling" aspects of the CRCP in terms of the recruitment and retention of researchers, the creation of research groups and focusing resources (especially infrastructure funded by the CFI component) strategically in selected areas, the enhanced training opportunities for students, and, more generally, the increased national and international reputation and profile of their institution. Those who felt the program could better respond to their needs cited various aspects of the program's design (e.g., award amount, allocation/reallocation process, issues with the tier system) or indicated that they would benefit from being allocated additional Chairs (including Special Chairs), especially as the program has now reached its maturity and fewer Chair positions are available to be filled.

Other views collected as part of general or case studies interviews (including those conducted with chairholders who have resigned a CRCP Chair) confirm the perception at the program and university levels that the program meets the needs of its stakeholders and that its objectives, individually and as a whole, remain relevant in the current context. The same conclusion applies to the CFI component.

Finding 1: Changes in the operating context of the program have not diminished the relevance of the CRCP's four main objectives, and stakeholders strongly agree on the continued need for the program.

Question 1.3: To what extent are there recent complementary or competing programs that are meeting similar needs for which the CRCP was designed to address?

A national and international scan of research funding programs was performed for comparability to the CRCP. As in the third-year and fifth-year evaluations, the results of this scan have demonstrated that the CRCP is unique within both the domestic and global contexts. Very few research funding programs of its type—government funded and led, providing substantial levels of funding for universities across

the country, and inscribed within an overarching, long-term, strategic national scientific and economic objective—could be found elsewhere.

At the national level, similar types of chairs are offered by universities (e.g., Queen's, McGill, Concordia), including university research chairs that are designed to replicate some of the characteristics of CRCP Chairs (e.g., funding amount, length, tier system) and aim to help attract or retain leading researchers. Other chair programs are funded by the federal granting agencies (e.g., NSERC's IRCs), by provincial agencies (e.g., Ontario, BC, PEI, Saskatchewan), by associations in a targeted region and/or field of study (e.g., SHARCNET Chairs), or by a corporate sponsor, for a specific period of time and on topics of particular interest to the sponsor (e.g., Bell Canada Chair). In addition, endowed chairs, which are usually funded by private donors or organizations, are generally offered to individual researchers in specific areas or within specific universities, and not limited to a specific duration in time. Finally, some evaluation informants mentioned the CERC program, although there are significant differences with the CRCP (e.g., larger amount, smaller number of chairs, two-stage selection process, link to federal S&T priority areas, among others).

All of these other programs and chairs differ on one or more aspects from the CRCP, with the vast majority comprising a small number of awards and (except for endowed chairs) offering funding for a shorter period of time than the CRCP. Based on available information, levels of funding and prestige vary greatly between awards, with some being higher and some being lower than the CRCP. Many evaluation informants indicated that the uniqueness of CRCP rests on its breadth and depth (i.e., the number of chairs, the multitude of disciplines, and the fact that it is accessible to universities across Canada), the well-recognized brand it has created, and its strategic dimension that links both faculty-building and infrastructure investments via the coupled CFI application. VPs Research were also unanimous in saying that the comparable Canadian programs were complementary to the CRCP, rather than overlapping, and this aligns with the views of program-level interviewees.

At the international level, previous evaluations and media articles on the program have noted that a number of other countries—including Australia, South Africa, Portugal, Singapore, New Zealand, Finland, France, and Spain—have investigated or have begun to model research funding programs on the CRCP. A brief scan of these international programs confirmed that the CRCP has imitators and comparable programs in other countries, almost all of them with a similar agenda to counter "brain drain." These programs confirm the value of the CRCP model but also suggest that, without the CRCP, Canada would likely lose ground in competing for leading researchers on an international scale; this has implications in the context of a continued need for the CRCP.

Finding 2: The CRCP is unique in Canada in terms of its combination of objectives, combined with the breadth and depth at which it operates.

2.2 Question 2: With respect to the overall objectives of the CRCP, does there remain a role for the federal government to play? What is the nature of this role?

As demonstrated in the program's logic model (Figure 1), the CRCP's inputs, activities, outputs, and outcomes are meant to align with the overarching federal priorities: a strong, innovative, and competitive national economy; an improved quality of life for Canadians; and a world-class research environment in Canada. None of the program-level interviewees disputed the federal government's role

in these matters or raised evidence to suggest that federal support to enhance the Canadian research environment (i.e., in universities) should be reduced. Neither the provinces nor the private sector were seen to be positioned to play this role at the necessary level. Rather, most informants explained that support for research and innovation was an appropriate and accepted "niche" for the federal government. In fact, the CRCP appears to have strengthened this role and was cited as "probably the best way in the Canadian context to do this role."

Canada's 2007 S&T Strategy is the current government's plan to achieve these goals. It sets out a comprehensive, multi-year S&T agenda, designed to help Canada foster three distinct S&T advantages (an Entrepreneurial Advantage, a Knowledge Advantage, and a People Advantage). The CRCP clearly aligns with the last one: "Canada must be a magnet for the highly skilled people we need to thrive in the modern global economy with the best-educated, most-skilled, and most flexible workforce in the world in order to create a People Advantage."[15] This can be directly related to the first CRCP specific objective of attracting and retaining excellent researchers in Canadian universities, as well as the objective related to the training of HQP. Indeed, universities are a key environment for the training of HQP, and the CRCP helps provide an enhanced environment for training in universities, including through better research infrastructure. Canada's *Economic Action Plan* (Fifth Report to Canadians, 2010) also reinforces the federal commitment to building a "strong, innovative economy through science, technology, and research excellence, while training new generations of highly skilled individuals."

The CRCP also clearly supports the Knowledge Advantage of Canada's S&T Strategy ("Canada must build upon our research and engineering strengths, generate new ideas and innovations, and achieve excellence by global standards") through the specific objectives of improving universities' capacity for generating and applying new knowledge and optimizing the use of research resources through strategic planning. Moreover, 80% of current CRCP chairholders conduct research in one or more of the four priority research areas targeted by the S&T Strategy.[16]

Finally, CRCP objectives were examined in relation to the current federal whole-of-government framework, which outlines 13 high-level outcome areas within four Government of Canada spending areas—Economic, Social, International, and Government Affairs.[17] In particular, under Economic Affairs, the outcome "An innovative and knowledge-based economy" is the most relevant to the CRCP, as illustrated by the following activities: "develop Canadian knowledge and expertise;" "fund and support academic research and research partnerships in such areas as natural sciences, health, engineering, and social sciences;" and "conduct scientific research and development." Under Social Affairs, research and knowledge creation conducted with CRCP support can also ultimately contribute by "supporting applied health research for policy development" ("Healthy Canadians" outcome), and by "enhancing knowledge of and fostering public engagement in Canada's history and cultural heritage" ("A vibrant Canadian culture and heritage" outcome).

[15] Government of Canada, 2007. *Mobilizing Science and Technology to Canada's Advantage*. See: http://www.ic.gc.ca/eic/site/ic1.nsf/vwapj/SandTstrategy.pdf/$file/SandTstrategy.pdf

[16] Canada Research Chairs, 2009. *Year in Review 2007–2008*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/07-08_Year_in_review.pdf

[17] See: http://www.tbs-sct.gc.ca/ppg-cpr/frame-cadre-eng.aspx

Finding 3:	The CRCP clearly aligns with Canada's S&T Strategy and other federal plans and priorities relating to research and innovation, which is an accepted role for the federal government.

3.0 Findings — Success of the CRCP

3.1 Question 3: To what extent have attraction and retention of leading/excellent researchers taken place?

Question 3.1: What are the barriers to attraction? Retention?

From its inception, a central objective of the CRCP has been to attract world-class researchers to Canadian universities and/or retain these researchers. Before examining the barriers to attraction and retention, the origin of CRCP chairholders during the evaluation period—particularly the proportion coming from outside of Canada—was assessed.

Nomination of CRCP chairholders from within or outside of Canada

The most recent administrative data available (up to date as of July 2009) indicate that, during the first 27 cycles of the program (2000 to 2008), a total of 2,135 individuals were successfully nominated and approved for the CRCP and subsequently served as chairholders. Of these, 68% originated from within Canada and 32% came from outside of Canada (Table V). A greater proportion of Tier 1 chairholders came from outside Canada (40%) than did Tier 2 chairholders (22%).

About half (52%) of the total chairholders were nominated by the university at which they were employed, indicating that their Chairs were used for retention; this proportion is greater for Tier 1 chairholders (63%) than Tier 2 chairholders (45%). In terms of temporal trends, a larger number of chairholders were recruited from abroad in the middle years of the program, with a high of 45% in 2004 (Table V). The rate of international recruitment has since decreased, so that the 2007 and 2008 rates are not very different from the 2001 and 2002 rates. About 62% of the chairholders attracted to Canada came from U.S. institutions, representing 20% (n=430) of all chairholders. An additional 17% came from European institutions, equalling about 5% of all chairholders; of these, 61% came from the United Kingdom.

Compared with other chair programs or regular university recruitment practices, the CRCP has played a larger role in the international recruitment of high-calibre researchers. For example, in a group of researchers holding chairs comparable to the CRCP (referred to as "other chairholders" in the present report[18]), a mere 7% came from institutions outside of Canada, compared with 32% of CRCP chairholders. It is important to mention, however, that this population of other chairholders includes researchers holding chairs that were designed specifically for retention. Within another comparable group, well-funded Tri-Council grantees (hereafter referred to as "grantees"), only 17% came from outside of Canada—about half of the proportion seen for the CRCP.

[18] "Other chairholders" excludes other chair programs administered by the federal granting agencies (e.g., IRCs). "Grantees" received substantial amounts of research grants from the federal granting agencies but do not hold a chair (CRCP or any other); see Appendix A for details.

Table V Origin of CRCP chairholders, 2000–2008

Origin of chairholders	2000	2001	2002	2003	2004	2005	2006	2007	2008*	Total
Non-University within Canada	0	1	4	10	11	8	4	3	3	44
Other Canadian university	5	17	23	40	54	38	36	36	34	283
Within nominating university	43	73	97	102	89	165	200	214	136	1,119
Total within Canada	48	91	124	152	154	211	240	253	173	1,446
Percent within Canada	91%	73%	70%	63%	55%	66%	69%	74%	70%	68%
Non-University outside Canada	0	0	12	15	27	13	19	11	14	111
University outside Canada	5	34	41	75	99	95	91	79	59	578
Total outside Canada	5	34	53	90	126	108	110	90	73	689
Percent outside Canada	9%	27%	30%	37%	45%	34%	31%	26%	30%	32%
Total chairholders	53	125	177	242	280	319	350	343	246	2,135

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Non-university within Canada	0	1	4	10	11	8	4	3	3	44
Other Canadian university	5	17	23	40	54	38	36	36	34	283
Within nominating university	43	73	97	102	89	165	200	214	136	1,119
Total within Canada	48	91	124	152	154	211	240	253	173	1,446
Percent within Canada	91%	73%	70%	63%	55%	66%	69%	74%	70%	68%
Non-university outside Canada	0	0	12	15	27	13	19	11	14	111
University outside Canada	5	34	41	75	99	95	91	79	59	578
Total outside Canada	5	34	53	90	126	108	110	90	73	689
Percent outside Canada	9%	27%	30%	37%	45%	34%	31%	26%	30%	32%
Total chairholders	53	125	177	242	280	319	350	343	246	2,135

Note: *Data are incomplete for 2008; these numbers do not include the last of the three funding cycles for that year.
Given the nature of this indicator, which considers the origin of individual chairholders at the time they were nominated, each chairholder is counted only once at the point of their initiation into the program.
Source: Compiled by Science-Metrix from the CRCP administrative database (CIMS)

In relation to concerns about "brain drain" (see Section 2.1), it is interesting to note that 44% of the chairholders who were based abroad at the time of their nomination are Canadian citizens (n=303), indicating that the CRCP contributed to returning these researchers to Canada. The CRCP has also helped to recruit international scholars to Canada, as 18% of chairholders were non-Canadian citizens based at institutions outside of Canada. Of those who hold citizenship other than Canadian (n=514), 35% are citizens of the United States (with 10% of these holding dual Canadian and American citizenship) and 45% are citizens of European countries. The United Kingdom is the native country of 14% of chairholders who are citizens of countries other than Canada. Similar to what was observed with regard to the proportion of chairholders coming from outside of Canada, these rates have fluctuated slightly but have not changed significantly between the two halves of the evaluation period.

Finding 4: Overall, 68% of CRCP chairholders originated from within Canada, and 32% came to—or returned to—Canada from international institutions. About half of the CRCP Chairs were used for retention.

These positive findings should not obscure the fact that attracting and retaining researchers has proven to be an ongoing challenge for universities in the context of the CRCP (see Question 3.2), in part given

the emergence of programs with similar objectives around the world in recent years and increased global competition for many of the very same researchers that the CRCP hopes to attract. Indeed, the CRCP's RMAF states that one of the key risks that may influence the program's ability to achieve its objectives would be its "inability to remain competitive in the international context."[19] Barriers to attraction and retention, as well as turnover of CRCP chairholders, are examined under Question 3.2.

Declined Chairs

Since the inception of the CRCP, almost 90 researchers have declined the offer of a CRCP after their successful nomination. The number of Chairs that are declined each year has remained relatively constant over the period. However, the number of new Chair positions has decreased since 2005 as most of the Chairs were filled, resulting in an increase in the proportion of Chairs that are declined, from about 3% in the first half of the evaluation period, to about 7% in the last five years (Figure 2). A greater proportion of Tier 1 Chairs are declined compared with Tier 2 Chairs; no differences were seen between the Chairs allocated to three federal granting agencies.

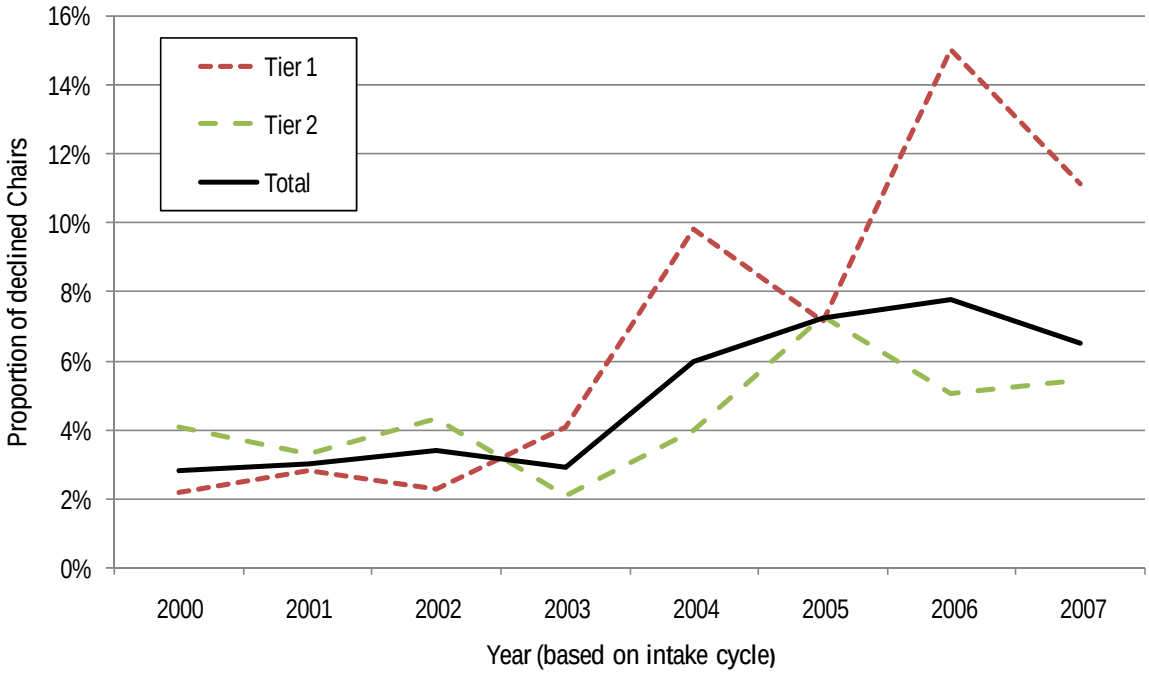

Figure 2 Proportion of declined Chairs to new Chairs, 2000–2007

Note: Renewals were removed from the list of declined chairs and CRCP Chairs. Data for 2008 are not presented as the CRCP Chairs dataset does not include the last of three cycles for that year.

Source: CRCP data, compiled by Science-Metrix

It is not possible to determine the reasons for this increase based on the available data; note that almost no evidence from the other lines of evidence (i.e., surveys and interviews) suggested that such an increase had occurred. Researchers who decline a Chair are invited to complete an exit survey, which could help understand this finding. However, only six such surveys were available; these researchers

[19] Canada Research Chairs, March 2006. *Integrated Results-based Management and Accountability Framework and Risk-Based Audit Framework*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/rmaf_e.pdf

cited dissatisfaction with the bureaucracy and length of the application process to the program or decided that, ultimately, the host institution was a poor fit for their research interests.

Evidence from chairholders who resigned their Chair

Internal documents and 10 interviews with chairholders who resigned CRCP Chair positions[20] indicate that chairholders almost always leave to assume a new position at another institution, either in Canada or abroad (as researchers cannot transfer their Chair to another institution, this move forces them to resign from the program). Reasons less commonly given for resigning a Chair were retirement, to release the chair for another researcher, or to return to a previous position. Tellingly, several of the researchers staying in Canada have applied or intend to apply for another CRCP Chair at their new institution.

Reasons for moving to a new position vary greatly. For some, the decision is motivated by better personal, professional, or research opportunities at the new institution, while for others, it is the result of dissatisfaction with these factors at the CRCP host institution, and some cite some combination of the two. Some departing chairholders—typically those who have left Canada[21]—indicated dissatisfaction with the Canadian research environment, such as the low success rate of grant applications or other issues with the funding climate. Reasons relating to better opportunities at another institution or in another country included better personal conditions (e.g., higher salary, endowed chair, opportunity for tenure), more interesting professional challenges (e.g., a leadership role, an opportunity to oversee a large hiring push as department chair), and a better research environment (e.g., more opportunities to take their research program in a new direction, greater operating support, better space/infrastructure, more support staff, more opportunities for collaboration, better recognition of their research area). When weighing their options, some interviewees indicated that the uncertainty attached to their Chair position (especially in the case of Tier 2 Chairs, which was seen as "only a 10-year venture") tipped the scales in favour of the opportunities offered by the other institution. Finally, in at least half of all cases, a personal matter (e.g., a family issue, the need to return home) also came into play.

Most departing chairholders perceived the funding package provided to them through the CRCP to be in the same range as that offered by similar programs in other countries, although many stipulated that there is a lot of variability on this point: different countries have different models for funding research, and it is always possible to find more appealing funding packages at the national and international level. Only a handful felt that the CRCP offers a better package to researchers than other similar programs (with the exception of privately funded endowed positions, of which there are few on offer). Those who believed that the CRCP offers less than similar programs internationally (particularly those in industrialized countries) stated that funding levels have not kept pace with international opportunities

[20] Five interviews with former chairholders who have pursued their research program in a country other than Canada and five with former chairholders who have moved to a different Canadian institution.

[21] Despite the small sample size, there appear to be no major differences between the reasons for leaving cited by researchers who resign their Chair to move to another Canadian university and those who decide to move abroad, one possible exception being dissatisfaction with the Canadian research environment, although some former CRCP Chairs who stayed in Canada also mentioned this and some who have left Canada would be willing to return. Wanting to live and/or work in Canada was also given by some former chairholders as the reason that they accepted a CRCP position in the first place.

and that their American and European colleagues were "doing better." Moreover, while start-up packages offered through the CRCP are perceived as competitive, maintenance of a sufficient level of funding may be a long-term issue because additional funding (e.g., for operating support and research staff and students) must usually be secured through other sources, and the CRCP award value is increasingly being dedicated to salary support by the host universities (who are responsible for administering the funds; see Section 5.1).

Factors that led to chairholders' dissatisfaction with their CRCP host institution were examined. Internal documents, supported by interview data, indicate that about two-thirds of the chairholders who resigned were satisfied or very satisfied with their institutions' research environment, but many nevertheless felt that they were not a proper fit with their host university. For example, the institution might lack "critical mass" (i.e., too few colleagues in the same area and/or a lack of graduate programs in their research area that would attract HQP to their team). Some of the chairholders who resigned cited a lack of adequate infrastructure, while others indicated that heavy teaching loads were a contributing factor to their departure. A lack of available funds for hiring graduate students or other HQP, a lack of technical support, and a lack of support to initiate collective work were also cited.

About one-third of the chairholders who resigned had experienced conflicts with the university administration over the handling of the CRCP award. This includes: cases in which initial institutional commitments outlined in the nomination package were not kept, inadequate management/allocation of the award funds by the administration, and dissatisfaction with the research funding packages offered by their host institutions (e.g., research funding dwindled over time as the CRCP award was taken up by salary; some researchers noted that they received the same funding package and benefits as other non-Chair full-time faculty in their departments and felt, therefore, that there was "no advantage of being a CRC"). In some cases, these conflicts were a direct result of issues with transparency and communication between the chairholder and the university, where expectations (on both sides) were not clearly expressed for various reasons (e.g., lack of time during the application process, lack of familiarity with Canadian research culture and processes).

Finding 5: The decision of chairholders to resign their Chair often results from dissatisfaction with their host university's research environment and/or infrastructure, its support for research, or its management of the CRCP award—particularly when these factors are combined with a more appealing offer at another institution.

Turnover of CRCP Chairs

Turnover of CRCP chairholders is relatively low. Based on the most recent data available from the CRCP (July 2010), roughly 19% of chairholders (n=394) have left the program over its 10-year span. While 12% of chairholders ended their terms early due to resignation, retirement, relocation, or death, 6% of all chairholders are not renewed by their host institution, sometimes in order to release these Chairs for reallocation. Finally, the CRC Steering Committee did not approve the renewal of about 1% of chairholders—17 in total—for another term. No notable trends in turnover were observed over time or by discipline area.

A review of the justifications for the decisions made by the CRCP indicate that most of the 17 non-renewed chairholders were found to have not sufficiently achieved program objectives in their first term considering their level (i.e., Tier 1 or Tier 2), particularly with regard to the production and

application of new knowledge (i.e., publication output, impact of research, leveraging of additional funds), as well as training of HQP. This suggests that the CRCP is upholding the standards expected of CRCP chairholders, although it was not possible to determine whether stricter standards could have been applied to the 680 chairholders who were renewed during the same period. Unfortunately, no data were available to examine factors that lead to the non-renewal of Chairs by universities. For example, it could not be determined how often universities chose to nominate a more appropriate candidate for a Chair instead of renewing the chairholder who had previously held the position, how often the rationale for non-renewal came from dissatisfaction with the chairholder's productivity, or if the university had an internal policy to limit the number of renewals offered to Tier 1 chairholders.

Question 3.2: How has the CRCP contributed to or alleviated barriers to attraction and retention?

There is strong evidence to suggest that the CRCP has helped to alleviate the barriers to attraction and retention of high-quality researchers. Indeed, the majority of program-level interviewees, VPs Research, CRCP chairholders, and even researchers who have not benefited from a CRCP Chair stated that the CRCP has contributed to the attraction or retention of leading researchers at Canadian universities.

University stakeholders believe that the program—including the CFI component (see Question 3.3)—gives institutions a competitive advantage in being able to offer an optimal research environment and generate start-up packages, both of which effectively help to recruit and retain researchers. Thus, 91% of VPs Research who completed the web survey stated that the CRCP had a positive impact on the ability of their university to attract and retain excellent researchers. In their annual reports, a number of universities described the CRCP as a major tool—one university calling it an "effective pre-emptive measure"—for the retention of top researchers.

Other evaluation informants supported the assessment that many of the current chairholders, especially those from outside of Canada, would likely not have remained at or transferred to their current universities without the support of the CRCP. Overall, 50% of CRCP chairholder survey respondents stated that it was "likely" or "very likely" that they would have pursued their research program in a country other than Canada had they not received the Chair; the largest proportion of researchers who considered leaving Canada was in the natural sciences and engineering (NSE) ($p < 0.05$) or those currently at large universities ($p < 0.001$).[22] Conversely, 28% stated that their going to another country was "not likely" or "not at all likely" (the remaining 19% were neutral). Overall, 86% of CRCP chairholder survey respondents agreed that "the CRCP has contributed to the attraction or the retention of leading researchers at my university," and only 3% disagreed.

Among other chairholders, 77% of survey respondents agreed that "the CRCP has contributed to the attraction or retention of leading researchers at my university" (11% disagreed), whereas a significantly smaller proportion (61%) believed their own award program had contributed to the same objective ($p < 0.05$). The grantees expressed the lowest level of agreement with this statement: 59% of grantee survey respondents agreed that the CRCP has contributed to the attraction or retention of leading researchers at their university while 20% disagreed; however, grantees were generally more critical of the CRCP than all other types of informants (see also Table XII and Section 3.4). Even some former

[22] Universities classified as "large" are those in the Group of Thirteen, which comprise the 13 leading research-intensive universities in Canada. These were compared with the 13 "medium" and 45 "small" universities that participate in the CRCP. This classification is based on that used by the federal granting agencies and in internal studies by/for the CRCP.

chairholders who left their CRCP Chair to move outside of Canada or to another institution indicated that they were originally attracted by the CRCP Chair, particularly if the Chair position coincided with another attractive factor (e.g., an interest in establishing their research program in Canada, infrastructure funding, the opportunity to contribute to a stimulating/growing project).

In the web survey, VPs Research of Canadian universities indicated that, prior to the launch of the CRCP, the main factors that limited their ability to attract or retain leading researchers were: the research infrastructure at their university (79% rating this "greatly" or "somewhat limiting"), the availability of research funding (70%), teaching loads (63%), salary offered and personal benefits (51%), and the availability of students and research staff (51%). Factors that most often aided universities in attracting or retaining leading researchers were: the reputation of the university (33% rating this "greatly" or "somewhat aiding"), the development of particular research domains at the university (30%), the cultural environment of the university (28%), and the location of the university (28%).

Researchers—whether CRCP chairholders, other chairholders, or grantees—were surveyed on which factors were most important in their decision to accept their position, chair, or award. While this does not necessarily point directly to barriers to attraction and retention, it is possible to better understand which factors, *if lacking*, could act as barriers to attraction and retention. All researchers combined, the factors with the highest rating for attraction (i.e., rated "important" or "very important" by at least 70% of respondents, all groups combined), are: the research funding available, the capacity to support students and research staff, the quality of the research environment, the university's quality of life, and the university's research infrastructure. Seeing the overlap with barriers identified by VPs Research, it becomes clear that aspects that restrict the ability of researchers from pursuing a successful research program—such as a lack of research infrastructure, a lack of research funding, and issues relating to availability and capacity to support students and research staff—are the key barriers to attraction and retention of researchers.

Finding 6: All of the key barriers to attraction and retention—lack of research infrastructure, lack of research funding, and issues relating to availability or capacity to support students and research staff—relate to the ability of researchers to pursue a successful research program.

Among CRCP chairholders specifically, factors that were most important in their decision to accept the Chair included (in order of importance): the availability of research funding, the capacity to support students and research staff, the quality of the research environment at the host university, and CRCP Chair status and prestige (Figure 3). The views of university administrators also support these findings. Breaking down the importance of factors by discipline, tier, and origin, some significant differences emerge from the web survey data (i.e., the CRCP chairholders survey). The salary offered was more important for CIHR chairholders than for NSERC chairholders ($p < 0.001$), and CRCP Chair clusters located at the host university were more important for CIHR chairholders than for SSHRC chairholders ($p < 0.01$). Both reductions in teaching load and personal benefits (other than salary) were more important for SSHRC chairholders than for either NSERC or CIHR chairholders ($p < 0.001$). As for chairholders at the two tier levels, the availability of research funding was more important for Tier 2 chairholders than for Tier 1 ($p < 0.05$), whereas the reputation of the university offering the Chair was more important for Tier 1 chairholders than for Tier 2 ($p < 0.05$). These differences point to the ways in which the CRCP can be adapted to respond to the different needs of researchers in different disciplines and at various points in their career.

Moreover, several factors contributed more significantly to researchers accepting a CRCP Chair from a large university, such as the research infrastructure; the quality of the research environment; CRCP Chair clusters, other prominent researchers, or other researchers with similar interests at the host university; the salary offered; and the reputation or location of the university (all $p < 0.01$). The reduction in teaching load was the only factor that was significantly more important for researchers accepting Chairs at small and medium universities.

Looking at the origin of CRCP chairholders, which is relevant when considering attraction versus retention, CRCP Chair status and prestige ($p < 0.05$) and the capacity to support students and research staff was found to be more important for researchers within Canada ($p < 0.05$)—especially for those already at the nominating institution—than for those coming from outside Canada. In contrast, the reputation of the university offering the Chair ($p < 0.001$), the salary offered ($p < 0.05$), and the number of researchers with similar interests at the host university ($p < 0.05$) were all more important for chairholders originating from outside of Canada than those nominated from within the country. University administrators confirm that the ability to undertake world-class research at a well-regarded institution, in combination with the added prestige and visibility of the chairholder's research profile, were common deciding factors for researchers considering whether to relocate.

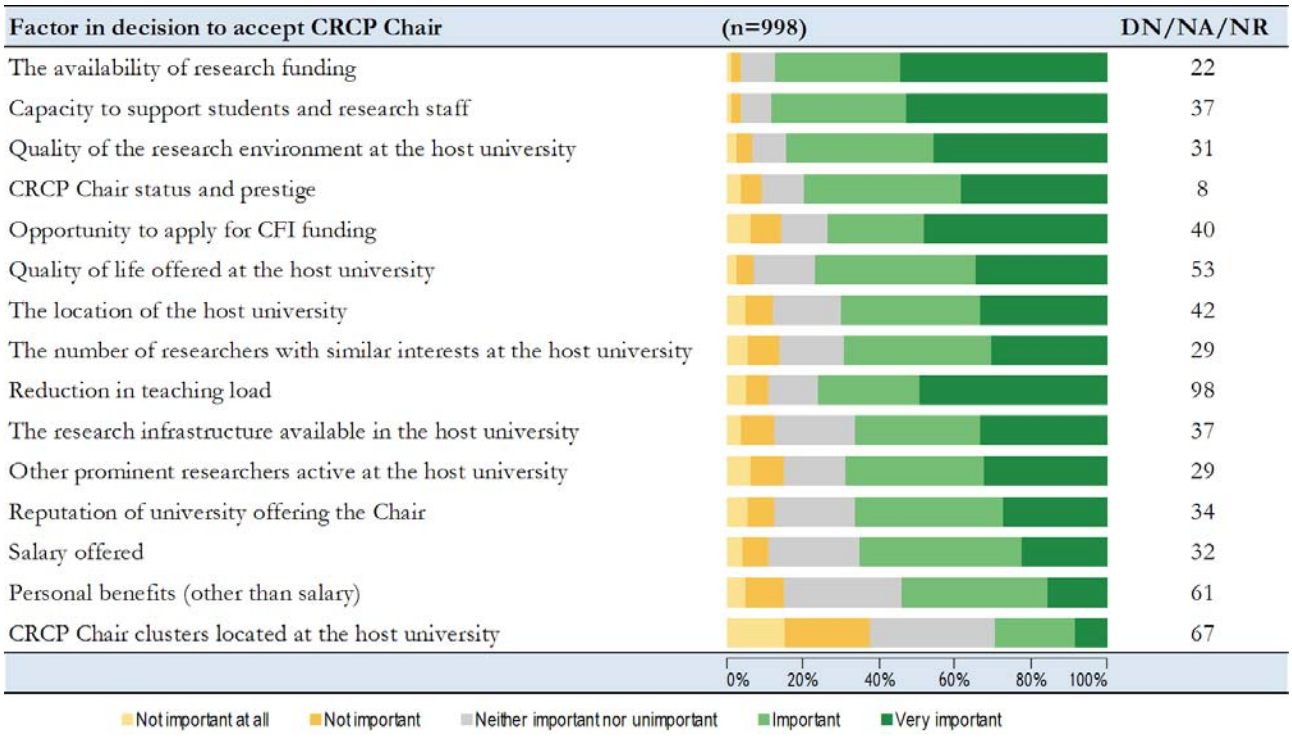

Figure 3 Importance of factors in chairholders' decisions to accept a CRCP Chair

Note: Percentages are shown based on those who gave a rating. Respondents who checked "don't know / not applicable" or did not respond are not counted in the total percentage but are presented in the DK/NA/NR column and will be reflected in the overall order. Factors are presented from high to low importance.

Source: Web survey of CRCP chairholders

Overall, the offer of a CRCP position is one of a number of factors that might influence chairholders to stay at their home institution or move to a different one. In the examples below, it should be kept in

mind that the CRCP may either act to enhance or act in concert with other incentives that are already present in the research environment, such as existing infrastructure, facilities, and equipment; access to top-tier graduate students; potential for collaboration, networking, and partnership with key external parties; and an overall supportive institutional climate. This suggests the importance for universities to act in a strategic manner—and align new Chair offerings with their own strengths in terms of a critical mass of researchers and infrastructure.

Finding 7: The CRCP helps alleviate barriers to attraction and retention by enhancing or complementing the availability of research funding, the capacity to support students and research staff, and the quality of the research environment at the host university, as well as by conferring status and prestige.

The case studies provided a large number of examples of ways in which the CRCP has helped alleviate barriers to attraction and retention. Once again, the CFI component was often cited as a factor; the contribution of CFI funding is discussed specifically under Question 3.3. As a whole, the VPs Research generally indicated that the combination of the CRCP and the CFI infrastructure funding support allows universities to offer packages to leading researchers that never would have been possible using exclusively internal funds—at least not in the quantities offered through the CRCP. It must be said, however, that even with the CRCP/CFI combination, many recruitment packages—particularly for candidates considering top US institutions—still require additional resource commitments on the part of the university in order to be competitive.

Clearly, the CRCP provides a base level of stable funds that can be drawn upon and leveraged into larger packages to entice the best researchers available. The CRCP has also helped to retain researchers who had received offers (including offers of a Chair) at other universities. Overall, the VPs Research believe that the CRCP is extremely important for the university's recruitment efforts, as it provides high-profile recognition of the nominee's status, represents a national-level commitment to the research enterprise, and—perhaps most importantly—provides a substantial amount of funding.

The CRCP has also been used for the attraction and retention of researchers in the following contexts:

- The CRCP has allowed smaller and/or primarily undergraduate universities to offer working conditions akin to that in major institutions and to retain faculty with ambitious research goals.
- The CRCP has provided the foundation for successful, broader external recruitment efforts. The CRCP Chairs have also been successfully deployed in combination with CERCs, Industrial Research Chairs (IRCs, administered by NSERC), university research chairs, endowed chairs, chairs from the province, and external sources to build the strongest possible research faculty.
- In larger universities, clusters of CRCP Chairs have been put forward to build core groups of highly talented individuals in key emerging areas. These are generally departmental-level initiatives that involve shared space and equipment between the cluster members. These types of initiatives have been effective at retaining and attracting top-level researchers to fill CRCP Chair positions.

Finding 8: The CRCP has been an effective tool in allowing universities to offer more appealing packages to leading researchers, and therefore it directly contributes to attraction and retention.

The case studies also highlighted certain challenging aspects of using the CRCP Chairs as a retention and attraction tool. For example, one university offers a commitment to full tenure-track positions along with the CRCP Chair, as the university administrators found it almost impossible to attract

quality people with a limited term offer. Similarly, another university commits a tenure-track position to all their Chairs, treating them like regular faculty. Furthermore, some universities have policies specifying that CRCP Chairs must be used solely for the appointment of academics from outside of the university (i.e., for attraction). In sum, the case studies demonstrate that the implementation guidelines for the CRCP administration at the institutional level allow sufficient flexibility for the use of the CRCP Chairs for retention, attraction, or, more commonly, for a balance in between, as per the university's needs. However, now that most Chair positions have been filled, and only a fraction are up for renewal every year, retention appears to be an increasing challenge for universities, especially as many clearly feel that the competition for chairholders is heating up.

Competition for leading researchers is also strong within Canada, as universities are increasingly making efforts to woo Chairs away from their home institutions. Some VPs Research pointed to a possible counterproductive use of the Chairs, in shuffling talent between universities within Canada: from a national-level perspective, it is not always clear how moving a strong scholar from one Canadian school to another represents a net gain in the country's overall international competitiveness (the exception perhaps being when a chairholder contributes to the creation or strengthening of a research cluster in another university's strategic research areas). As one university representative stated, "This is an unfortunate by-product of the CRC program." Overall, universities know that they must continue to support the work of chairholders (i.e., provide an adequate level of salary; the necessary time, space, and equipment; and the facilitation of research support) to effectively counter attractive offers from elsewhere.

Finding 9: Strong competition for leading researchers—from both national and international institutions—is a challenge for universities, and appears to be heightened by the CRCP at the national level.

Question 3.3: How has the CFI component contributed to attraction and retention?

Several sources argued that there was a clear need for infrastructure funding in Canada at the time the CRCP was implemented; as such, both the CFI and the CFI component of the CRCP received high praise. The essential nature of the CFI component of the CRCP has not diminished over time: program-level interviewees and the VPs Research were very nearly unanimous in agreeing on the high importance of the CFI for the attraction and retention of leading researchers. In fact, some interviewees suggested that, in recent years, the CFI had improved both in its delivery system (i.e., increased flexibility at the university level) and in the amounts granted to chairholders. There is strong evidence from evaluation informants and from other sources of evidence that removing the CFI component of the CRCP would drastically reduce the program's ability to attract and retain leading researchers.

The importance of the CFI component is shown by the extent to which chairholders have applied for it, especially in their early stages of their Chair. CFI funding was requested in 80% of new CRCP applications (with a success rate of 95%) but in only 15% of CRCP renewals (with a success rate of 100%); these rates are comparable with those of the program as a whole. No changes were observed in CFI applications or success rates over time. CFI amounts have increased steadily over the period, from an average of $135,000 in 2000 to an average of $158,000 in 2008. In contrast, the CRCP award amounts have remained fixed since 2000.

The CFI component was found to act synergistically with the CRCP for the attraction and retention of leading researchers by increasing the financial and symbolic value of the Chair position, and by providing the infrastructure, equipment, and state-of-the-art facilities that researchers require to achieve a successful research program and to be competitive at the international level. Some universities report that the opportunity to use a new or updated facility was the main reason that top talent was attracted to their institution. Moreover, by spearheading the effort to upgrade or establish new facilities, chairholders contributed to making the institution ever more attractive for future recruits—CRCP Chairs or other leading researchers.

VPs Research further explain that CFI funds offer universities the opportunity to compete on the world stage for top researchers by providing competitive start-up packages that are comparable to most international research institutions, even with top-tier US state-funded systems like those in Michigan and California (although some other top US universities may be able to offer packages in the physical and life sciences that are often still outside of the range that is accessible using a combination of CRCP/CFI funds). In the case studies, the CFI component was also shown to be crucial for smaller, less research-intensive schools, as the infrastructure obtained with these funds have allowed the retention of top researchers who might otherwise have left for larger institutions.

In the web surveys, 77% of CRCP chairholders stated that the opportunity to apply for CFI funding was important in their decision to accept the Chair. Not surprisingly, the opportunity to apply for CFI funding and the research infrastructure available at the host university was more important for both CIHR and NSERC chairholders than for SSHRC chairholders ($p = < 0.001$), considering the nature of their research. Interestingly, the research infrastructure available in the host university was more important for grantees and other chairholders than for CRCP chairholders ($p = < 0.001$) in their decision to accept a chair, award, or position at a university, suggesting that CFI funding makes up for barriers to attraction or retention relating to lack of infrastructure that would otherwise exist.

The value of the CFI component is also supported by the views of chairholders who have resigned their position. Several of these interviewees indicated that they left their host institution (or Canada) in large part because the infrastructure or space promised by the university had fallen through, because they were disappointed that CFI funding had not been offered by the university (in their initial CRCP application and/or for their CRCP renewal), or that the university had not supported requests for subsequent equipment proposals that the chairholders felt was necessary for the advancement of their research program. Reasons cited for the absence of a CFI component include the fact that the CRCP application was under a tight deadline so there was not enough time to prepare the CFI application,[23] as well as the fact that the university intended to use their CFI allocation for other types of research.

Finally, two additional examples of ways in which the CFI component has contributed to attraction and retention were observed in the case studies. First, the CFI component is seen as a major recruitment tool, particularly for Tier 1 chairholders, who tend to have well-established facilities in their present location and are unlikely to move to another institution where the necessary supporting infrastructure and equipment may not be immediately available. Thus, the CFI component may be an essential

[23] The CFI application is included with the CRCP application and so the deadlines are determined by the CRCP. Chair nominees complete a short form application to request infrastructure support from the CFI. Informants indicated that the CFI application is quite detailed and that it can take a substantial amount of time to prepare.

condition of the relocation of Tier 1 chairholders. Second, some Tier 2 chairholders identified the CFI component as a major factor in their decision to accept their Chair, as it greatly increased their start-up package and enabled them to fully equip their laboratories and other facilities at the outset, which in turn enabled the rapid production of results needed to leverage further funding. The CFI component may therefore play an essential role in launching the research programs of more junior scholars, and thus contributes to the CRCP's ability to attract and retain young promising researchers.

Finding 10: All sources agree that the CFI component of the CRCP is crucial to the attraction and retention of leading researchers in Canadian universities.

3.2 Question 4: What has been the CRCP's contribution to the capacity of universities to produce and apply new knowledge?

Research output and scientific impact

A bibliometric analysis of the scientific output of CRCP chairholders was used to assess their scientific output published in peer-reviewed papers, as well as the scientific impact of that portion of their production. In the bibliometric analysis, the output of CRCP chairholders was compared with that of three comparable groups of high-calibre researchers: 1) unsuccessful CRCP applicants; 2) a selected population of other chairholders (with a similar distribution as CRCP chairholders with regard to discipline area and career status, i.e., "matched other chairholders"; note that the sample excludes other chair programs administered by the federal granting agencies, such as the IRC); and 3) a matched sample of grantees (based on council, discipline, and institution size) who had received substantial funds relative to the average for their institution size and discipline (i.e., "matched grantees").[24] Note that the groups of matched other chairholders and grantees do not necessarily contain the same researchers as the web survey groups. While these results provide an objective assessment of the scientific production, impact, and quality of the research output of chairholders, just like any type of assessment, the use of bibliometrics is associated with a number of caveats, which are mentioned alongside the results below.

Overall, the results of the bibliometric analysis indicate that CRCP chairholders performed significantly better than each comparable group in terms of scientific production (except for matched grantees, where no difference is observed), impact, and quality (Table VI). This assessment is based on three indicators (which are presented in greater detail in Appendix A):

1) scientific production is assessed by counting papers in peer-reviewed journals indexed in the Scopus database (average number of papers);
2) scientific impact is assessed by counting citations received by the groups' papers, which are relativized by subfield to reflect varying citation behaviours between areas of research (average of relative citations or ARC);
3) scientific quality is estimated by examining whether papers are published in highly cited journals. Since the most highly cited journals tend to be more prestigious and have greater leeway in selecting the best papers, this is a proxy for quality (average of relative impact factors or ARIF).

[24] The matched grantees had never held a CRCP Chair, nor were they part of the group of unsuccessful CRCP applicants.

A first comparable group, unsuccessful CRCP applicants, was selected to assess whether the CRCP's peer-review process retained the researchers who demonstrated greater scientific performance over the 1996–2008 period, as measured by their published output in peer-reviewed journals. The results of this comparison show that the CRCP's peer-review process retained the best applicants in terms of their scientific production, impact, and quality (number of papers, ARC, and ARIF values, respectively). These results show that the scientific output of CRCP chairholders generally outperforms that of other eminent researchers in Canada (i.e., matched other chairholders), as well as that of some of the best researchers funded through the three councils' traditional grant programs (i.e., matched grantees).

Table VI Bibliometric comparison of the scientific production, impact, and quality of CRCP chairholders and comparable groups, 1996–2008

Indicator	Comparable group	CRCP chairholders	Median comparison	*p* -value
Scientific production	Average no. papers	Average no. papers		
Unsuccessful CRCP applicants	29	48	Unsuccessful < CRCP	0.00
Other chairholders	48	63	Other < CRCP	0.01
Matched grantees	48	55	n.s.	0.30
Scientific impact	ARC	ARC		
Unsuccessful CRCP applicants	1.44	1.80	Unsuccessful < CRCP	0.00
Other chairholders	1.68	1.85	Other < CRCP	0.00
Matched grantees	1.58	1.91	Grantees < CRCP	0.00
Scientific quality	ARIF	ARIF		
Unsuccessful CRCP applicants	1.44	1.80	Unsuccessful < CRCP	0.00
Other chairholders	1.38	1.47	Other < CRCP	0.00
Matched grantees	1.35	1.44	Grantees < CRCP	0.00

Notes: Each comparison was performed with a purpose-built sample, which comprised a relevant combination of Tier 1 and Tier 2 researchers relative to each comparator group. This—as well as the fact that Tier 1 researchers publish noticeably more, that their papers receive more citation (high ARC), and that they publish in higher-quality journals (higher ARIF) than Tier 2 researchers—explains why the scores of the CRCP chairholders' samples vary considerably across comparator groups.
n.s.: Not significant, considered significant for *p*-values smaller than 0.05.
Source: Calculated by Science-Metrix using the Scopus database

It is not surprising, therefore, that CRCP chairholders also received, on average, significantly more citations than other Canadian researchers in all comparisons performed (data not shown), indicating that both Tier 1 and Tier 2 chairholders across the three councils have a greater scientific impact than Canadian researchers as a whole. Based on their scientific production, scientific impact, and scientific quality, it can therefore be concluded that the program was successful in selecting eminent scholars who lead (Tier 1) or have the potential to lead (Tier 2) in their fields.

Data on the output of CRCP chairholders and comparable groups were also collected as part of the web surveys; these data cover outputs other than those published in peer-reviewed journals and span a two-year period (Table VII). Unfortunately, an oversight in the web survey design meant that data on published books were not systematically collected in the surveys. However, several respondents added books to the "Other" category—8% of CRCP chairholders indicated that they had published one or more books—but the fact that this category was not explicitly provided means that this is an

underestimation of the real total. Similarly, 9% of other chairholders[25] and 6% of grantees counted at least one book in the "Other" category.[26]

Table VII Output of CRCP chairholders and comparable groups in the 24 months prior to the web survey

	CRCP chairholders		Other chairholders		Grantees	
	%	Mean/ CRCP	%	Mean/ Other C	%	Mean/ Grantee
Published refereed journal articles*	96%	11.8	94%	10.0	96%	8.1
Published non-refereed journal articles	40%	3.6	35%	4.8	37%	0.9
Published book chapters*	61%	3.0	70%	3.0	57%	1.4
Multi-media content	19%	3.6	19%	2.6	11%	0.5
Conference and symposium presentations/posters*	93%	16.3	89%	13.2	93%	9.6
Patents/licences	17%	2.5	11%	1.7	15%	0.4
Creative/artistic works	4%	3.0	2%	1.0	4%	0.2
Other	22%	6.5	23%	3.8	15%	0.7
Total outputs		32.4		26.4		21.6

Notes: *Difference between groups is significant ($p < 0.01$).
The mean includes all researchers, even those who reported no outputs in the category.
Source: Science-Metrix surveys of CRCP chairholders, other chairholders, and grantees

CRCP chairholders also produced significantly more conference and symposium presentations and posters than did the two other groups ($p < 0.001$). However, other chairholders published significantly more book chapters than either CRCP chairholders or grantees ($p < 0.01$). Interestingly, a greater proportion of CRCP chairholders in the NSE produced at least one patent (21%), compared with other chairholders (16%) and grantees (11%); it should be noted, however, that the number of other chairholders and grantees in the NSE in this sample is quite small (55 or fewer) and there is no significant difference in the number of patents produced by the three groups. No other statistically significant differences were found. Taken together with the bibliometric analysis and informed opinions of other evaluation informants (data not presented), this clearly points to the high level of output of CRCP chairholders in peer-reviewed journals and other modes of knowledge dissemination.

Finding 11: The bibliometric analysis shows that CRCP chairholders produce a greater number of peer-reviewed papers, are cited more frequently, and are more often published in high-impact journals than comparable groups of leading researchers. CRCP chairholders also disseminate their research results via many other modes, including conference proceedings and posters, books and book chapters, patents, creative works, etc.

The bibliometric analysis also sought to address whether the CRCP itself (through award funding or by conferring other types of advantages) contributed to enhancing the scientific performance of its chairholders, either in terms of their number of published journal articles or in terms of the scientific impact of these journal articles. A pre-post analysis was conducted, which compared the research output and scientific impact of CRCP chairholders before and while supported by the program.

[25] "Other chairholders" excludes other chair programs administered by the federal granting agencies (e.g., IRCs). "Grantees" received substantial amounts of research grants from the federal granting agencies but do not hold a chair (CRCP or any other); see Appendix A for details.

[26] Several web survey respondents were rightly critical of the fact that this category had not been included as an option in the surveys; this oversight should be corrected in future surveys or data collection on the outputs of CRCP chairholders.

Overall, the increase in the scientific production of CRCP chairholders and the shift in the pace of growth that was observed between the two periods (i.e., before holding the Chair and while holding the Chair) is likely the result of the positive effect of the CRCP. However, this positive effect is mostly attributable to the growth in scientific production measured among CRCP chairholders in the NSE. The scientific impact of CRCP chairholders as a whole declined. Similarly, scientific quality declined for CRCP chairholders, taken as a whole. The analysis of the control group (i.e., unsuccessful applicants to the CRCP) showed a similar decrease, suggesting that the apparent decrease in scientific impact and quality of the chairholder's output might not be attributable to the CRCP. It is challenging to interpret these effects, especially as these trends are not identical at the level of tiers and granting agencies. Further conclusions are hindered, moreover, by the smaller sample sizes when the data are broken down by tier and council, as well as by external factors that could come into play and which cannot always be controlled for (e.g., career status, increase in the database coverage).

Another limitation was linked to differences in the preferred modes of research dissemination across disciplines. For instance, the smaller production (i.e., average number of papers per researcher measured in the bibliometric analysis) of chairholders in SSHRC's areas of research compared with those from the other two councils is related to the fact that an important proportion (between 40% and 60%) of the knowledge produced in the SSH is disseminated through the publication of books and other types of documents that are not adequately covered in the database used to perform the bibliometric study. Thus, these analyses cover only a fraction of research outputs in the SSH. If the CRCP induced a shift in the types of output produced by the chairholders in the SSH (i.e., with stable funding, the willingness of a researcher to invest time in a book might increase, as this is often the most prestigious research output in the SSH), one might expect the production of articles to remain stable or even to decrease slightly in the period with the Chair. If that is the case, the program might have a positive effect on the production of books or other types of documents, which were not measured in this study. In addition, since a book takes longer to produce than an article, such an effect might only start to be detectable three or more years after chairholders begin their CRCP term. As noted above, (incomplete) data on books collected as part of the web survey indicate that at least 8% of chairholders had published one or more books in the past two years, of which at least two-thirds were produced by SSHRC chairholders.

VPs Research were nearly unanimous in finding a positive or very positive impact of the CRCP on the research outputs of their university (98%). Several universities highlighted the high level of activity and output of their chairholders and the fact that some are among the most highly cited scientists in the world in particular areas. In the case studies, instances of chairholders with substantial scientific outputs during their Chair term were also noted. As such, appointing a Chair is seen as a way to ensure that the universities contribute to the international body of literature in that research area.

There are likely many reasons that explain the effects—or lack thereof—of the CRCP on the research output and scientific impact of its chairholders. Some university administrators and chairholders have said that the CRCP, in providing an increased level of funding and (in some cases) teaching release, "means that chairholders have more time for research, and generally a larger number of students and assistants to help them to process preliminary results." One chairholder, who had previously held an IRC sponsored by an industrial partner, stated that the CRCP Chair offered more freedom to set his own research agenda and pursue theoretical lines of inquiry alongside the more practical ones favoured

by industry, which then opened both new areas of research and new possibilities for applications in his field. Another chairholder said that the CRCP increased the quality of his research output by providing secure funding that allowed him to hold back and refine certain publications rather than rushing them into print to bolster his publication list. There may also be unintended effects of the CRCP—positive and negative—that affect the chairholder's time and capacity to produce research results; these will be discussed in Section 3.5.

Chairholders may also be involved in other modes of research dissemination, such as in their teaching, or in sharing research results with organizations in public or private sectors. The majority of CRCP chairholders found that their research results were presented as part of undergraduate or graduate courses: 61% rated this "often" or "always," compared with 52% of other chairholders and 58% of grantees, although the differences are not significant. Chairholders also pass on knowledge and expertise to their students through training and mentoring (see also Section 3.4). In addition, 59% of CRCP chairholders report that in the past five years, they have "often" or "always" shared their research results with organizations (e.g., firms, government agencies, departments, hospitals, healthcare providers, cultural/arts/social organizations), which is significantly more than for other chairholders (56%) or grantees (42%) ($p< 0.05$). The case studies highlighted the fact that clinical scientists will often share information relating to the practice of medicine with clinicians, residents, and other healthcare workers, as well as through the organizations (e.g., hospitals, health clinics) that participate in their studies.

As mentioned above, CRCP chairholders are also significantly more active presenters at conferences and symposia than are other chairholder and grantees. Furthermore, annual reports and case study findings show that chairholders often play a large role in developing, coordinating, organizing, hosting, or participating in conferences in Canada and abroad. Many of these knowledge dissemination activities also tie in with the collaborative practices of chairholders and with the effects of the CRCP on the reputation of Canadian universities, which are both discussed in Section 3.3.

Impact and application of new knowledge

Having established that CRCP chairholders actively disseminate their research results, it remains to be determined to what extent this new knowledge was applied and led to subsequent impacts. As a whole, the VPs Research were extremely positive regarding the impact of the CRCP on the research quality, impact, capacity, and visibility of their university. The annual reports submitted by the universities to the CRCP contain glowing praise of the quality and importance of the new knowledge generated by the chairholders, as well as details on the significance of impacts made by individual chairholders and by the CRCP as a whole. University administrators also find that the high regard in which chairholders are held in this country may enhance the impact of their research in certain fields, as their recognized expertise lends weight to their opinions.

Examples of impacts of CRCP-supported research were reported in sectors ranging from public policy to industry, and from health to education. While no significant differences were seen in the extent to which researchers reported effects of their funded research in these sectors among the three survey groups (e.g., CRCP chairholders, other chairholders, and grantees), a qualitative review of survey responses indicated strong evidence for the way in which the CRCP itself contributed to these impacts. Whereas grantees provided more direct examples of the impact of research *funding* on their research

results, other chairholders were less likely to cite the fact that their chair or award had contributed to the use or impacts of their research results than did CRCP chairholders (with regard to their CRCP Chair). Often, impacts were related to increased opportunities for collaboration or increased prestige, visibility, time, or resources associated with the CRCP Chair position (see also Section 3.3):

- "Certains de mes résultats seront utilisés par une entreprise locale. Sans la chaire, je n'aurais pas eu le contrat d'expertise que la compagnie m'a octroyé."
- "I am able to spend quality time on research-networking with NGOs and not-for-profit organizations because of my CRCP Chair (prestige, resources, and the time it allows me to do this)."
- "The related CFI funding was essential to our basic research in the health sector and our collaborative research with a local biotech company with which we're developing novel therapeutics."
- "Mes résultats de recherche ont toujours été utilisés pour l'élaboration de politiques publiques mieux adaptées. L'obtention de la Chaire permet cependant d'avoir des ressources plus permanentes pour nourrir les partenariats et intensifier la dissémination."
- "The chair designation was important in being invited to serve as a member of a provincial Advisory Panel, which has produced a scientific assessment through a consultative community-based planning process. Similarly, the chair designation has been important in serving more broadly as a reviewer of government and NGO reports."
- "The community organizations and health sector are more aware of my research because of the profile the CRC gives me within the University. As a result, I have new invitations to partner with community and health sector organizations."
- "The CRCP Chair position provided an authoritative central position from which to organize this funding and [multi-sectoral collaborative] research program."
- "The long-term window of opportunity that comes with the CRCP chair allowed me to work with Universities and Government to develop a commercialization centre."

Finding 12: The CRCP directly contributes to the capacity of chairholders to have external organizations take up the new knowledge they have generated.

As the above quotes indicate, some chairholders are engaged in areas of public policy, particularly those who aim to transfer knowledge to government authorities and create linkages with non-governmental organizations (NGOs) in policy areas. In the web survey, 39% of chairholders report seeing their research used in the government sector, 26% by NGOs and 23% by community and not-for-profit organizations; these organizations can be local, provincial, national, or international. The case studies illustrate how chairholders have been personally invited by organizations in these sectors to provide input on public policy on issues ranging from public health, immigration, environmental contaminants, and good governance. This knowledge transfer may take the form of working with provincial or federal government(s) in their specialty area; advising and informing projects of relevance to NGOs and community groups; making presentations to ministers and senior leadership at public institutions; or acting as members of expert panels, commissions, and other committees that examine policy issues.

The R&D performed by chairholders has also led to the commercialization of technologies. As many as 40% of chairholders (and 50% of NSERC chairholders) reported the use of their research in industry. Indeed, some chairholders seek to develop products and production methods that are commercially relevant, often in partnership with industry (including with investments from firms). As seen in Table VII, 17% of chairholders reported that they had obtained patents or licences in the two previous years for the marketing of new products or processes. Some chairholders have even established spin-off companies themselves, and these start-ups may have helped to create additional jobs and increase the impact and visibility of these Chairs' research.

The case studies, web surveys, and annual reports also help illustrate the chairholder's health-related, environmental, social, and cultural impacts.

- CRCP chairholders have pursued applied health research in a wide span of areas, such as through studies of population health and health promotion in particular groups or regions, as well as through the development and study of medical treatments or products. The development of new therapeutic applications is often conducted in partnership with private firms, whereas studies on population health and healthcare delivery models are most often developed in collaboration with the health providers and used by organizations involved in health policy.
- Chairholders' work in the area of environmental research has often responded to regional or national research needs on diverse topics such as biodiversity, environment impacts in fragile Canadian ecosystems (e.g., Arctic), risk assessment of environmental contaminants, industrial waste management, and coastal resource management. The goal of this research may be to create the tools and knowledge that will guide policy makers and regulators in Canada—and abroad—to prescribe more environmentally sustainable practices. This research may also focus on developing new methods and practical applications, the results of which are found at various stages in the commercialization process.
- Social and cultural impacts generally include the creation of institutes, events, or other opportunities that bring culture industry figures (e.g., artists, authors, publishers, agents) or certain groups (e.g., local agencies and community members) together with university researchers and students, promoting dialogue and networking for future projects. For instance, CRCP-supported projects have supported greater awareness of the needs of certain vulnerable or marginalized populations and ways to address these needs, such as through participatory exhibits, working groups, and consultations; these efforts often related to specific policy impacts. In addition, 8% of chairholders report the production of creative and artistic works (Table VII), and several chairholders in the arts and humanities point to their role in the promotion and preservation of cultural heritage. It should be noted here that some chairholders, particularly those in the SSH or those primarily involved in basic research, expressed dissatisfaction with the way in which their research outputs and their impacts were assessed in the context of the CRCP.

To assess the frequency with which new knowledge was being solicited or used by various groups outside of the academic sector, CRCP chairholders, other chairholders, and grantees were asked to rate how often their research was being used for various purposes. At least 70% of chairholders reported that they were "often" or "always" invited to present their research results to external organizations in the last five years (Figure 4).

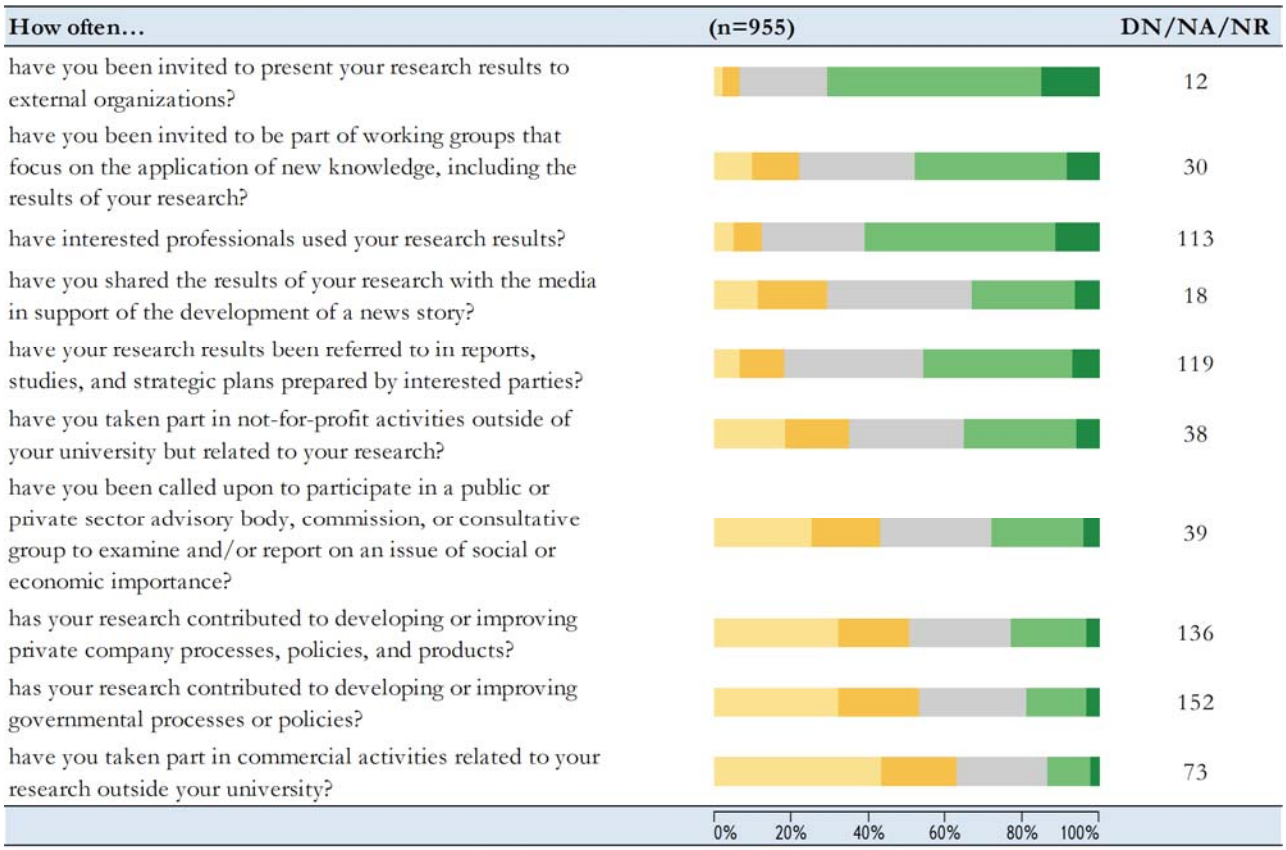

Figure 4 Frequency of external use and sharing of CRCP chairholders' research

Note: Percentages are shown based on those who gave a rating. Respondents who checked "don't know / not applicable" or did not respond are not counted in the total percentage but are presented in the DK/NA/NR column and will be reflected in the overall order. Activities are presented from high to low frequency.

Source: Web survey of CRCP chairholders

More specific uses were less frequently reported, although this is to be expected given the wide range of research topics and applications reported by CRCP chairholders. Compared with grantees, CRCP chairholders more frequently reported having "been invited to be part of working groups that focus on the application of new knowledge, including the results of your research" ($p < 0.05$). And, compared with both other chairholders and grantees, CRCP chairholders more frequently reported having their "research results been referred to in reports, studies, and strategic plans prepared by interested parties" ($p < 0.001$). No other significant differences were found, but the frequencies reported by CRCP chairholders for the other items in Figure 4 were almost always higher than those reported by grantees.

One often-mentioned item by evaluation informants, which is featured in Figure 4, is the frequency with which chairholders are invited to provide expertise to the development of news stories broadcast in the media. Several chairholders reported an increase in this practice compared with before they were awarded a CRCP Chair, and indicated that their work had been highlighted in local, national, or even international media outlets. One chairholder pointed out that reporters seek out CRCP chairholders for their known expertise, and this is one more way in which the program has created an opportunity to generate awareness or new knowledge. The CRCP website also provides a tool through which the

media can "find an expert." The media exposure of the CRCP and its chairholders does appear to be substantial: more than 3,500 articles mentioning the program and its chairholders were published between April 2007 and March 2008;[27] it would be of interest to compare this exposure with that of comparable programs in future evaluative studies.

Finding 13: The knowledge generated by CRCP chairholders has been taken up, shared with the media, applied, and has generated impacts in the policy, industrial, health, environmental, social, and cultural spheres—in some cases more frequently than that of comparable groups.

The web surveys also included questions to determine the impact of CRCP funding on the chairholders' production of new knowledge and its use and impact, as well as comparisons with the impact of other chairs and awards and federal research funds (i.e., those received by grantees). While the CRCP funding was perceived to be beneficial to outcomes relating to the quality and impact of research, in all cases, grantees reported that their research funds had a significantly greater impact than that reported by CRCP chairholders for their CRCP funding and that reported by other chairholders for the funding associated with their chair or award (Table VIII). This strongly suggests that operating funds for research are more directly responsible for the production of high-quality and high-impact research results than funds that are often used mainly for salary support (particularly for Tier 2 Chairs; see Section 5.1).

CRCP Tier 1 chairholders were found to give a significantly more positive rating to the impacts of CRCP funding than did Tier 2 chairholders for all five of the items in Table VIII; recall that Tier 1 Chairs receive a $200,000 award and Tier 2 Chairs receive a $100,000 award, although the career status of chairholders is also likely to be factor in this difference. Some of the case studies, however, suggested that the Tier 2 Chairs actually provided a greater net overall benefit to chairholders than the Tier 1 Chairs because the careers of these promising researchers is less established to begin with. Thus, start-up grants and infrastructure packages, teaching release, prestige, and a guaranteed source of support can provide a bigger advantage to this group of researchers; it allows them to "jump right into" their research programs and start generating results as soon as possible. This appears to be particularly true of lab-based disciplines where large infrastructure requirements are needed in order to initiate their proposed projects. Instead of comparing the impact on Tier 2 chairholders with that of Tier 1 chairholders (whose careers are already well established), it would be of interest to compare the impact of the CRCP on Tier 2 chairholders with the impact of funding or other chairs on researchers at a similar stage in their careers, which was not possible with the available data.

[27] Canada Research Chairs, *Year in Review 2007–2008*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/07-08_Year_in_review.pdf

Table VIII Perceived impact of CRCP funding, funding from another chair/award, or federal research grants on research quality and impact

	CRCP chairholders (n=969)	Other chairholders (n=145)	Grantees (n=125)
Impact of funding on…	Positive or very positive	Positive or very positive	Positive or very positive
The quality of your research*	85%	75%	100%
Your capacity to produce and apply new knowledge*	79%	69%	97%
The impact of your research on new scientific knowledge*	76%	65%	92%
The impact of your research on Canadian society*	64%	51%	78%
The use of your research in Canadian society*	56%	46%	66%

Notes: *Difference between groups is significant ($p < 0.01$).
The percentages include all researchers, even those who did not provide a rating for the category.
Source: Science-Metrix surveys of CRCP chairholders, other chairholders, and grantees

Nonetheless, the CRCP chairholders as a whole rated the impact of their funding more positively than the other chairholders rated the funding associated with their chair or award with regard to "the quality of your research," "your capacity to produce and apply new knowledge," and "the impact of your research on new scientific knowledge" ($p < 0.001$). Thus, even though additional research funds likely play a large role in the chairholders' capacity to produce high-quality and high-impact research, the CRCP funding appears to have a bigger impact in this regard than funding provided by other chairs and awards. Moreover, the impact of CRCP funding may also have a greater impact in the SSH than in health sciences or NSE research, as the impact of CRCP funding on "your capacity to produce and apply new knowledge" was perceived more positively by SSHRC chairholders (84%) than by chairholders from the other two councils (both 78%) ($p < 0.001$). Though not statistically significant, three of the four other items in Table VIII received more positive ratings by SSHRC chairholders.

To complement these findings, the case studies showed that, when CRCP funds were available for research, this consistent, predictable, and guaranteed source of funding provided an important stability for the chairholders. In particular, it provided an intellectual freedom for researchers, which is harder to maintain when one has to compete for smaller, shorter-term grants.

Overall, these results highlight the impact of the CRCP and the importance of funding in general, as well as the importance of the chairholders' capacity to leverage additional research funds, which is discussed below. These results should also be interpreted in the context of a comment made by many chairholders in surveys and interviews, to the effect that the impact of the CRCP is often difficult to quantify, seeing how the CRCP funds are allocated, namely that a shrinking portion of CRCP funding is not taken up by the researcher's salary: "The lion's share goes to the chairholder's salary. The direct benefit to research is secondary."

Finding 14: The contribution of the CRCP to the quality, impact, and use of the new knowledge produced by chairholders is positive but is difficult to quantify, as chairholders generally require additional research funds, which likely play a larger role than the CRCP funds in this regard.

Leveraging additional funds

In light of the importance of funding to research quality and impact, an important indicator of the CRCP's contribution to the capacity of universities to produce and apply new knowledge is the extent

to which CRCP chairholders successfully leverage additional funding, both from the federal granting agencies and from sources outside of the federal government. Internal documents show that at least 85% of CRCP chairholders held federal grants during the 2000–2007 period (data are incomplete or unavailable for 2008 onward), and that a wide range of external sources of research funds that have been accessed by chairholders in addition to federal grants. Thus, there is little doubt that chairholders, as a whole, are successful at obtaining grants and other funds to support their research. Program-level and university administrators, as well as case study evidence, also confirmed that CRCP chairholders are as a group successful at leveraging research funds from federal granting agencies and a variety of outside sources, both public and private. In fact, the amounts leveraged by a few chairholders actually dwarf the CRCP amount.

What is the contribution of the CRCP itself to this success, and to what extent are CRCP chairholders more successful at leveraging funds than comparable groups? The answers to these questions are both complex and necessarily nuanced, especially when the differential, the leveraging success of certain subgroups of chairholders, is considered (e.g., Tier 1 or 2, nominated from within or outside Canada, university size). In particular, the research funding needs, culture, and policies in the three main disciplines represented by the three federal funding councils must be taken into account when analysing data on leveraging. The following discussion primarily reviews past internal studies on the success rates of the CRCP and presents somewhat limited findings stemming from the survey data.

The majority of CRCP chairholders indicated that either the CRCP funding (74%) or the CRCP award (excluding the funding;[28] 71%) had had a positive impact (Table IX) on their ability to obtain additional research funding. The impact of the CRCP on chairholders' capacity to leverage research funding from sources other than the federal government was not perceived to be as strong, with positive ratings dropping to 56% and 59% for the funding and Chair (excluding the funding), respectively. University administrators are near unanimous (91%) in claiming that the CRCP has had positive benefits on the ability of chairholders to obtain research funding.

As shown in Table IX, a smaller proportion of other chairholders indicated that their chair (or similar award) had had an impact on their ability to leverage funds. Both CRCP and other chairholders were asked to provide separate ratings for i) the impact of their chair funding only, and ii) the impact of their chair excluding the funding. Compared with CRCP chairholders, significantly fewer other chairholders reported an impact of their chair when the funding was not taken into account ($p < 0.01$), which suggests that the CRPC confers a symbolic(rather than financial) advantage to its chairholders, possibly in the form of increased prestige or recognition, which helps leverage research funds. A few chairholders perceived a negative impact of the CRCP on their ability to leverage funds; this is a potential unintended impact of the program and will be discussed in Section 3.5.

[28] In the web survey, chairholders were asked to provide a separate ratings on i) the impact of the CRCP funding only and ii) the impact of the Chair but disregarding the impact of the funding.

Table IX Perceived impact of CRCP or other chair on leveraging

Impact of funding of CRCP/other chair	CRCP chairholders (n=969)		Other chairholders (n=145)	
	Positive	Negative	Positive	Negative
Your ability to obtain additional research funding	74%	3%	67%	1%
Your capacity to leverage research funding from sources other than the federal government	56%	1%	44%	1%

Impact of CRCP/other chair (excluding funding)	CRCP Chairholders (n=967)		Other Chairholders (n=145)	
	Positive	Negative	Positive	Negative
Your ability to obtain additional research funding*	71%	2%	53%	2%
Your capacity to leverage research funding from sources other than the federal government*	59%	1%	43%	1%

Note: *Difference between groups is significant ($p < 0.01$).
Ratings of "positive" and "very positive" were combined, as were ratings of "negative" and "very negative." The percentages include all researchers, even those who did not provide a rating for the category.
Source: Science-Metrix surveys of CRCP chairholders and other chairholders

Tier 1 chairholders reported a more positive impact of CRCP funding specifically (but not on the impact of the Chair when the impact of the funding is excluded) than did Tier 2 chairholders on their capacity to leverage research funding from sources other than the federal government ($p < 0.05$); there were no significant differences in the responses from chairholders from the three funding agencies. Respondents to the grantees survey indicated similar ratings as CRCP chairholders with regard to the impact of their grant funds (data not shown). Taken together, these findings once again suggest that research funds leads to future benefits.

While chairholders did not provide much additional information in the web survey on how the CRCP might confer this advantage, the case studies suggest that the associated prestige, academic freedom, stability of secured and continuous funding, and infrastructure are likely factors that allowed chairholders to pursue and strengthen their research program, leading to further success at obtaining research funds. More commonly however, chairholders pointed to the fact that the CRCP award does not include an amount dedicated to research funds. Because the amount of the CRCP award that is allocated by universities to cover research costs is rapidly shrinking (see Section 5.1), chairholders increasingly have to rely on grants from the funding agencies to support their operating costs, student and staff salaries, and other associated research costs. Thus, any factors that may affect the ability of chairholders to obtain research funds will be critical to the continued success of chairholders.

Finding 15: Evaluation informants consider that the CRCP—both the funding and the title itself—contributes to chairholders' capacity to leverage additional research funds.

The issue of success rates of CRCP chairholders in other federal agency granting competitions is a concern that has a bearing not only on the chairholders' ability to pursue their research, but also on what it may suggest about the quality of the chairholders themselves. In particular, the success rates of CIHR chairholders in obtaining federal funds is lower than for the two other councils and appeared to drop between 2000 and 2007. Thus, a series of internal studies and analyses were conducted covering the 2000 to 2007 period, which concluded that, overall, CRCP chairholders had higher success rates and received larger grants than applicants in comparator groups (full professors were compared with Tier 1 chairholders and assistant and associate professors were compared with Tier 2 chairholders).

These findings apply to all three federal funding agencies, and support the notion that the CRCP selection process is successful in identifying and supporting the most competitive researchers.

However, when the results of these internal studies are broken down by tier and funding agency, it quickly becomes clear that other factors that influence chairholders' funding success can act in a sometimes complex manner. For example, CIHR Tier 1, CIHR Tier 2, and NSERC Tier 1 chairholders have a lower success rate in small universities than in large universities. Moreover, CIHR Tier 1, CIHR Tier 2, and SSHRC Tier 1 chairholders, if recruited from abroad, have lower success rates than those recruited from Canada.

These internal studies cover the 2000 to 2007 period, whereas the data collected for this evaluation in the web survey cover the period between April 1, 2007, and March 31, 2009. CRCP chairholders were asked to indicate to which federal funding agency they had applied for funding (i.e., CIHR, NSERC, SSHRC) and whether they had received this funding. These data differ from that reported in the internal studies in that there were no significant differences in the proportion of chairholders who received funding within each Council, even when examined between tiers or based on origin of the chairholder (within or outside of Canada). When the applicants to all three councils were pooled, no differences were seen in the success of chairholders from different councils or tiers, but chairholders originating from outside Canada had an overall lower success rate than those originating from within Canada ($p < 0.05$). However, any comparison between these findings and those of the internal studies may not be valid because of differences in the way the data were collected (i.e., the internal studies measured success for specific programs and for individual applications, whereas the survey simply examined funding success over a two-year period with no details on the type or amount of the award).

Although the findings based on survey data are not sufficient to conclusively address this particular question, the observed differences do suggest that further in-depth studies on this question (i.e., using data extracted from the funding councils' databases) should be conducted to better understand potential changes in the leveraged funds obtained by certain subgroups of chairholders, which could also inform potential changes in the program design and delivery to better meet the needs or specific issues of these subgroups.

Finding 16: CRCP chairholders are generally more successful at leveraging additional research funds from the funding councils than comparable groups.

Question 4.1: How has the CFI component contributed to the universities' capacity to produce and apply new knowledge?

The amount of CFI funding associated with CRCP Chairs has been considerable: over $279 million was linked to 1,811 Chairs (including new chairs and renewals) between the launch of the CRCP in 2000 and June 2010. Distribution of CFI funding across the two tiers and three funding agencies is closely aligned with the overall distribution of CRCP Chairs, which is not surprising considering the high success rates of CFI applications for CRCP chairholders (i.e., 95% for new Chairs and 100% for renewed Chairs). However, statistical analysis shows that Tier 1 chairholders received, on average, larger CFI amounts than did Tier 2 chairholders ($p < 0.001$) and that the average CFI awards of CIHR and NSERC chairholders are larger than those received by SSHRC chairholders ($p < 0.001$).

Description of CFI-funded infrastructure

Evidence from internal documents, case studies, and web surveys were used to assess the type of infrastructure funded by the CFI component. Universities often cited the CFI-funded development of research centres or the expansion of existing facilities within the institution as being most beneficial to increasing their research capacity. For example, new facilities have been built or renovated, including research institutes and high-tech laboratories where cutting-edge research is now being performed. New or renovated facilities also include office space to support the work of research teams. Other CFI-funded improvements include new, highly specialized equipment, tools, computer hardware or software, or other technologies for specific purposes. Universities explain that, in some cases, infrastructure needed to be obtained and made functional in a timely manner, and it was only through CRCP-associated CFI funding that this could be achieved. Conversely, some chairholders reported delays that prevented them from advancing their research program within the expected timeframe; this unintended effect of the CRCP is examined in Section 3.5.

In the web surveys, CRCP chairholders detailed how they had allocated their CFI funding. The vast majority (79%) indicated that they had purchased new research infrastructure with these funds, which represented, on average, 66% of their allocation. A smaller proportion was allocated to developing their research infrastructure (19%) and modernizing equipment (14%). Very few chairholders used the funds to acquire databases (5%) or lease research infrastructure (1%). When asked to specify other uses for these funds, chairholders most often listed the renovation of research facilities or the purchase of computers and furnishings for student offices, seminar rooms, and other types of shared facilities.

Compared with the 80% of CRCP chairholders who reported in the web survey having received CFI support for one or more of their Chair terms, a mere 21% of other chairholders[29] reported having received with their award additional funding dedicated to research infrastructure expenses. Grantees were asked more generally whether they had obtained additional funding dedicated to research infrastructure expenses (i.e., not necessarily linked to their federal grant), to which 50% indicated the affirmative. Note that in both cases, this additional funding may not have come from the CFI. However, these data do indicate that the CFI component associated with the CRCP provided a greater proportion of researchers with infrastructure funding (no matter the source) than via chair programs or compared with the proportion of grantees who have obtained such funding. Note that the design of this evaluation did not include a comparison between the amounts of infrastructure funding received by the two other groups.

Contribution of the CFI component to research capacity

There is broad consensus among evaluation informants—at the program, university, researcher, and even student level—that the CFI-supported infrastructure, equipment, and facilities have a direct impact on the ability and capacity of chairholders to maintain high-level research programs, as well as to attract and retain leading researchers (see Section 3.1). As the CRCP award funds are primarily used

[29] "Other chairholders" excludes other chair programs administered by the federal granting agencies. For example, the summative evaluation of NSERC's Industrial Research Chairs program concluded that the CRC program CRCP and IRC program are "distinctive from one another, with the IRC program being uniquely focused on industrial research" (see: http://www.nserc-crsng.gc.ca/_doc/Reports-Rapports/evaluations/IRC_Eval_06_e.pdf). "Grantees" received substantial amounts of research grants from the federal granting agencies but do not hold a chair (CRCP or any other); see Appendix A for details.

for salary support, associated CFI funds are often the main source of support within the CRCP package that the chairholders can use to support some of their research costs, more specifically, their research infrastructure. This was seen as particularly valuable in contexts where research budgets are modest, such as in certain fields or in smaller universities.

Similar to the contribution of the CFI component for the attraction and retention of leading researchers, CRCP and its CFI component act synergistically for the improvement of research capacity. In the web survey, the VPs Research were particularly emphatic regarding the impact of CFI funding on their university, with at least 90% seeing positive impacts of the CFI component on the overall research quality, research outputs, and opportunities to conduct research within their university. At least 90% of VPs Research also perceived positive impacts of CFI funds on multidisciplinary and national collaborations, and the ability of researchers to obtain funding.

When asked a similar question, CRCP chairholders' responses were slightly more nuanced, although at least 80% found the CFI funding had a positive or very positive impact on the quality of their research, their capacity to produce and apply new knowledge, the quality of the training of their students and research staff, their ability to attract more students and research staff, and the impact of their research on new scientific knowledge. Between 60% and 75% of chairholders also perceived positive impacts on their ability to obtain research funding or on various collaborative practices (whether international, national, or intra-institutional, or on their overall quality). These ratings are supported by other lines of evidence (i.e., case studies, interviews).

Some differences were observed in the ratings provided by chairholders according to their tier and primary funding agency. For example, CFI funding was seen to have a significantly more positive impact on the quality of collaborations and intra-institutional collaborations for Tier 2 chairholders compared with Tier 1 chairholders ($p < 0.05$), suggesting that for more junior researchers, CFI funding might be more important in attracting collaborators and establishing working relationships with their colleagues within the university. Moreover, the CFI's impact on research quality, on the ability to obtain research funding (including the capacity to leverage research funding from sources other than the federal government), on the quality of collaborations, and on the impact of research on new scientific knowledge were all rated significantly higher by both CIHR and NSERC chairholders than by SSHRC chairholders ($p < 0.001$). As a whole, CIHR and NSERC chairholders gave more positive ratings to the impact of CFI funding on research capacity and collaboration than did SSHRC chairholders.

Interestingly, if chairholder ratings for the impact of CFI funding on research capacity were compared with those given for CRCP funding or for the non-financial aspects of their CRCP Chair, the CFI funding was almost always perceived to have a higher impact. The results were significant in several cases: for example, the perceived impact of CFI funding was statistically greater than that of CRCP funding with regard to the quality of chairholders' research, their capacity to produce and apply new knowledge, their capacity to leverage research funding from sources other than the federal government, the quality of the training of students and research staff, and the impact of their research on new scientific knowledge ($p < 0.001$). Combined with the other evidence in this section, these results confirm that the CFI contribution to the CRCP is truly a key component with regard to the program's impact on the enhancement of research capacity.

Several lines of evidence illustrate how CRCP-associated CFI funding has allowed universities to build and equip state-of-the-art facilities, which help chairholders stay at the forefront of their research, acquire new technical abilities, and enhance the training of their HQP. In particular, the case studies described how the CFI funds were used for the improvement of facilities and the provision of various types of equipment—from high-capacity servers to analytical instrumentation—and thus established the infrastructure needed for first-rate research. Specific benefits of these CFI-funded infrastructure improvements included:

- facilitating the development of a top-of-the-line research facility for both qualitative and quantitative work, including research training rooms; computing and multimedia equipment; and administrative support/coordination facilities (The university worked with five teaching units in the area to put together the infrastructure support package that was used to establish the chairholder's regional laboratory, which is unique in Canada.);
- setting up a facility that subsequently obtained additional funds (e.g., NSERC Research Tools and Instruments grant) for equipment and upgrades;
- purchasing equipment that became one of the most valuable aspects of the CRCP for the enhancement of HQP training—some HQP also mentioned the appeal of CFI-funded facilities;
- purchasing sophisticated equipment needed to establish one of the few labs in the world in which certain environmental contaminants can be examined from the molecular to the ecosystem level; and
- making the unique research infrastructure purchased with CFI funds accessible to the larger community—samples that previously needed to be sent away can now be processed on-site, with benefits both to the academic community and industrial researchers in the region.

Although CIHR and NSERC chairholders gave more positive ratings to the impact of CFI funding on their research capacity, SSHRC chairholders also reported several such benefits. For instance, the CFI awards often provided the means to establish a research institute or resource centre, which provided the physical environment, resources, and facilities that enabled the chairholder to bring together university researchers, students, and cultural or social figures in ways that are unusual or unique in these fields. In these cases, the necessary infrastructure includes items such as computing capacity, imaging support, renovation of space, and conference and exhibit facilities. While these CFI-funded centres allow the "space to think" that is crucial in SSH research, they also offer a research environment in which colleagues and students can interact, access libraries and other collections, and use computers and other equipment that would otherwise be unavailable. In fact, some interviewees in the social sciences stated that the CRCP and its CFI component were particularly beneficial to members of these disciplines, who have fewer opportunities for infrastructure grants or endowed Chairs.

However, some evaluation informants indicated that infrastructure funding for researchers in SSH disciplines remains undervalued by a number of researchers and university administrators, and possibly within the larger infrastructure funding model. This assessment could be supported by the fact that a smaller proportion of SSHRC chairholders apply for CFI funds than for either NSERC or CIHR chairholders, and that a larger proportion of SSHRC chairholders who do apply receive less than 90% of the amount they requested from the CFI compared with chairholders from the other councils. It is important to note that, overall, the number of chairholders receiving 90% less than the amount requested is relatively low, at 48 (17 SSHRC, 19 NSERC and 12 CIHR), which represents 5.1% from

SSHRC, 2.1% from NSERC and 1.9% from CIHR.[30] Then again, the fact that fewer CRCP chairholders in the SSH who did receive CFI funding generally report positive impacts suggests that the benefits of infrastructure support for research capacity may be less direct in the SSH than in other disciplines or may be more dependent on external factors (such as university support)—or a combination of both.

Indeed, as they both oversee the campus infrastructure and receive CFI funds, universities play a central role in ensuring the CFI funding is allocated and used in a manner that is most beneficial to their research capacity. In most cases, universities were found to adequately undertake this role, providing the required assistance and support to ensure that CFI-supported infrastructure improvements produced the expected benefits. However, as seen in the case studies and general interviews, a few chairholders found that the university offered little assistance with issues such as building codes and labour, were difficult to communicate with or slow to process the necessary paperwork, provided inadequate space, and in certain circumstances, denied or withheld infrastructure support (including CFI funds) for years, or even altogether. Seeing how valuable the CFI component is, institutional commitment to infrastructure renewal and improvement is therefore crucial to ensure the full benefits of this aspect of the program.

Finding 17: CFI funds, which support the installation and maintenance of state-of-the-art equipment and facilities, have been instrumental in bolstering chairholders' research capacity.

3.3 Question 5: To what extent has the CRCP contributed to universities developing a comparative advantage in strategic areas of research?

Research centres and clusters

In the web surveys, close to half of the researchers report that their university has a research centre in their area of research, whether they are CRCP chairholders (51%), other chairholders[31] (47%) or grantees of the three federal granting agencies (46%). However, more CRCP chairholders (48%) say that their Chair contributed to the creation of the research centre than did other chairholders (27%) ($p < 0.01$). Presumably, the CRCP-associated research centres would also be in one of the university's strategic research areas, whereas this would not necessarily be the case for research centres associated with other chairholders. More Tier 1 chairholders contributed to creation of these centres than Tier 2 chairholders, as would be expected of their stature ($p < 0.001$). Moreover, SSHRC chairholders (57%) more often indicated that they had contributed to the creation of the research centre in their area than did CIHR (43%) or NSERC chairholders (47%), although the difference is not significant ($p = 0.075$). There were no differences across universities of different sizes, but chairholders who had received CFI funding were significantly more likely to report that they had contributed to the creation of a research centre than those who had not received the CFI component ($p < 0.05$).

[30] This difference could also occur if SSHRC applicants more often included cost items that are determined to be ineligible for CFI funding; eligible/ineligible costs are largely set out in the funding agreement between CFI and Industry Canada.

[31] "Other chairholders" excludes other chair programs administered by the federal granting agencies (e.g., IRCs). "Grantees" received substantial amounts of research grants from the federal granting agencies but do not hold a chair (CRCP or any other); see Appendix A for details.

The case studies provided examples of research centres or institutes that were created with the assistance of the CRCP (and, of course, with associated CFI funding), and confirm that the Chair can act as the catalyst or a cornerstone of these efforts. The case studies also show that sometimes the strengthening of an existing centre is just as valuable as the creation of a new centre in terms of developing an advantage in areas of research that have already been established within the university. For instance, existing centres may first serve to attract leading researchers and subsequently find themselves enhanced by the presence of one or more CRCP chairholders. In addition, by placing chairholders in existing centres, more of the CRCP (or CFI) resources can go to enhancing the research capacity of the centre instead of being taken up by the costs involved in setting up a new institute or group. Thus, the finding that more than 50% of CRCP chairholders can access a research centre in their field at their university is a positive finding with regard to the research capacity in strategic areas, even in the cases where the CRCP did not contribute directly to the creation of this centre.

The case studies, internal documents, and VP Research web survey also demonstrated how the CRCP can provide added benefits for universities when used in the context of a research centre (new or existing). The centres support facilities that go beyond the individual chairholder and help to bring together researchers from other departments to work in the Chair's area, as well as colleagues, collaborators, research partners, graduate students, post-doctoral fellows, technical staff, and visiting scientists. Formal research centres developed and headed by chairholders often help to boost the institutions' national and international reputation for research in the relevant areas. Ultimately, they create attractive packages that will both attract and retain top researchers, support research collaboration, and attract matching funds.

In addition to research centres, the CRCP can directly or indirectly support the internal collaboration of leading researchers in strategic areas. About 65% of CRCP chairholders agreed or strongly agreed that funding from the CRCP had resulted in the creation or reinforcement of research teams within their university (Table X). This is significantly higher than the proportion of other chairholders who consider that their other chair or award program played a similar role ($p < 0.001$).

Table X Perceived impact of CRCP funding or funding from another chair/award on the creation or reinforcement of research teams

	CRCP chairholders (n=958)		Other chairs (n=142)	
To what extent to you agree or disagree that...	Agree	Disagree	Agree	Disagree
Funding from the CRCP/my award has resulted in the creation of new research teams within my university.*	66%	10%	42%	26%
Funding from the CRCP/my award has resulted in the reinforcement of existing research teams within my faculty or university.*	65%	6%	47%	14%

Notes: *Difference between groups is significant ($p < 0.001$).
Ratings of "agree" and "strongly agree" were combined, as were ratings of "disagree" and "strongly disagree." The percentages include all researchers, even those who did not provide a rating.
Source: Science-Metrix surveys of CRCP chairholders and other chairholders

Not surprisingly, therefore, more CRCP chairholders felt that that there had been an increase in the research in their area at their university since they obtained their Chair (77%) than did other chairholders since they had obtained their other chair or award (63%) ($p < 0.001$). As in the case of research centres, more Tier 1 chairholders than Tier 2 chairholders saw effects of the CRCP on the

creation or reinforcement of research teams, and in the increase in their area of research ($p < 0.01$); similarly, chairholders who received CRCP-associated CFI funding saw greater effects on these same elements than those who did not receive it ($p < 0.05$). Reinforcement of research teams and increases in research in their area were also perceived more often by NSERC chairholders than by those from the other two councils ($p < 0.05$). There were no differences based on university size.

A high proportion of VPs Research agreed that the CRCP (including CFI funding) had resulted in the creation of new research teams (88%) or in the reinforcement of existing teams (81%) within their universities. In addition, 42% of grantees agreed that the CRCP had resulted in the creation of new research teams within their university, with 51% agreeing that the CRCP had contributed to the reinforcement of existing teams.

The case studies and VP Research web survey also highlight how research clusters can be a cost-effective and tactical approach to establishing or strengthening strategic research areas. For example, existing clusters have gained momentum when the university used the strategic research plan to guide strategic complementary hires and commit institutional support, creating a critical mass that drew better students and post-docs, and even leading to the formation of international collaborative networks. The chairholder often acts as the cornerstone of the cluster and helps to generate further funding for the cluster from both federal and provincial sources. Some chairholders also indicated that an informal cluster can be superior to establishing a research centre or institute because the administrative costs and the requirements of a formal structure can detract from the maximum possible research activity.

Finding 18: The CRCP—more than other chair programs—is clearly associated with the creation and enhancement of research centres and clusters in areas of strategic importance.

Collaboration (national and international)

Collaboration is widely regarded as a practice that can improve the quality, impact, and reach of research, as well as enhance the use of research resources; as such, it is examined here to assess the extent to which the collaborative practices of CRCP chairholders support the objective of helping universities develop a strategic research advantage. Findings on whether CRCP chairholders collaborate more than comparable groups or whether they collaborate more as a result of the CRCP are mixed.

The bibliometric analysis examined patterns of scientific collaboration based on co-authorship of peer-reviewed publications. The results show that, overall, CRCP chairholders have a similar propensity to collaborate both nationally or internationally as other chairholders and matched grantees from the three funding agencies. Moreover, the CRCP's selection process generally did not retain individuals that stand out for their propensity to collaborate internationally or nationally, with the exception of the NSE, where selected individuals collaborate more with international partners (based on the comparison of chairholders with unsuccessful CRCP applicants). In a pre-post analysis, the bibliometric data also showed that CRCP chairholders generally had significantly greater collaboration rates (national and international) in the period supported by the CRCP compared with the unsupported period. However, this increase cannot be attributed to the CRCP, as similar patterns of growth in the national and international collaboration rates were observed for Canada as a whole.

In the web surveys, CRCP chairholders perceived that the CRCP has had a positive or very positive impact on their collaboration patterns, including on their national and international collaborations

(Table XI), but as seen in the bibliometric analysis, this may simply reflect the general trend of increased collaboration seen at the Canadian level. Indeed, compared with CRCP chairholders, a greater proportion of grantees considered that the funding from the federal granting agencies has had a positive impact on their national and international collaborations; this difference is significant in the case of international collaborations ($p < 0.001$). Then again, other chairholders[32] reported significantly less positive impact of their other chair or award program on their collaborations, both national and international, than did CRCP chairholders (Table XI; $p < 0.001$), suggesting that the CRCP has contributed more to increasing national and international scientific collaboration than other chair programs. VPs Research were also extremely positive, with over 90% perceiving such an impact of the CRCP on both national and international collaboration. Thus, it can be concluded that the CRCP has likely helped CRCP chairholders keep pace with other Canadian researchers in this regard.

Table XI Perceived impact of CRCP funding, funding from another chair/award, or federal granting agency funding on collaboration

	CRCP chairholders (n=969)	Other chairholders (n=145)	Grantees (n=125)
Impact of funding on…	Positive or very positive	Positive or very positive	Positive or very positive
The quality of your collaborations*	69%	54%	88%
The multidisciplinarity of your collaborations*	63%	43%	73%
Your intra-institutional collaborations*	61%	47%	70%
Your national collaborations*	68%	52%	78%
Your international collaborations*	70%	56%	90%

Notes: *Difference between groups is significant ($p < 0.001$).
The percentages include all researchers, even those who did not provide a rating for the category.
Source: Science-Metrix surveys of CRCP chairholders, other chairholders, and grantees

The impact of the CRCP was also assessed for ways in which collaboration patterns can change beyond the co-authorship of scientific papers. Collaborative practices reported by web survey respondents included co-editorship of books and journals; participation in or leadership of committees organizing scientific conferences, symposia, and other events; collaboration with partners in non-academic sectors (e.g., industrial, health, government, not-for-profit, cultural, etc.); involvement of students and other HQP (see also Section 3.4); and other formal and informal linkages. Indeed, the case studies and web surveys both found several instances in which the chairholders credited the CRCP with their ability to access or attract potential collaborators for co-publication and other activities.

As such, it is not surprising that the majority of CRCP chairholders found that both the CRCP funding specifically (Table XI) as well as the non-financial aspects of their CRCP Chair (data not shown) had a positive impact on the quality of their collaborations, the multidisciplinarity of their collaborations, and their intra-institutional collaborations. Once again, these impacts were seen as more positive by grantees than by CRCP chairholders, and more positive by CRCP chairholders than by other chairholders ($p < 0.001$).

[32] "Other chairholders" excludes other chair programs administered by the federal granting agencies (e.g., IRCs). "Grantees" received substantial amounts of research grants from the federal granting agencies but do not hold a chair (CRCP or any other); see Appendix A for details.

If the responses of CRCP chairholders are compared across tiers and granting councils, two main trends appear. First, the impact of CRCP funding on "the multidisciplinarity of your collaborations" and "your international collaborations" were perceived as greater by Tier 1 chairholders than by Tier 2 chairholders ($p< 0.01$), but this difference disappeared when the question was asked with regard to the CRCP *excluding the funding*.[33] As seen with regard to the impact of funding on research quality, impact, and leveraging, the benefits of research funding—which are greater for Tier 1 than for Tier 2—may also play a role in collaboration.

Second, the impact of both the CRCP funding and the CRCP excluding the funding was perceived significantly more positively by SSHRC chairholders than by NSERC or CIHR chairholders for "your intra-institutional collaborations," "your national collaborations," and "your international collaborations," as well as for CRCP funding only on "the quality of your collaborations (all $p< 0.05$ or less). Chairholders from both small and medium universities also reported a more positive impact of the CRCP on their national and international collaborations compared with those from large universities ($p< 0.001$). This suggests that the CRCP may be particularly beneficial for the collaborative practices of researchers in the SSH compared with health sciences or NSE disciplines, as well as in small or medium universities.

Finding 19: The CRCP supported increases in national and international scientific collaboration more than other chair programs and helped CRCP chairholders keep pace with other Canadian researchers. The impact of the CRCP funding on collaborative practices is perceived most positively by Tier 1 chairholders, those in the SSH, and those in small and medium universities.

Reputation

A large majority of the evaluation informants consulted agreed that the CRCP had played an important role in improving Canada's international reputation with regard to research. It should be noted that international informants were not consulted as part of this study; the findings presented herein are therefore limited to the views of various informants within Canada. The size and prestige of the program, its success in attracting world-leading researchers to Canada, and the fact that it signals a serious commitment on behalf of the government to invest in high-end research were most often cited as the ways in which the CRCP has been effective in this way.

However, views on the strength of the international reputation of the CRCP were mixed: while many universities and chairholders felt that the program was very well known and well regarded around the world (pointing to the fact that a number of countries have developed programs that are modeled on the CRCP), quite a few believed that most researchers outside of Canada (unless they are ex-pats themselves) are unaware of the program. Indeed, anecdotal evidence from interviews suggests that a large proportion of chairholders who were recruited from abroad learned about the program from the university who nominated them.

Survey findings also support the conclusion—especially viewed from the inside—that the CRCP has significantly contributed to Canada's international reputation in research, but that further inroads are possible. Whereas 86% of CRCP chairholders agree or strongly agree that the CRCP has contributed to

[33] In the web survey, chairholders were asked to provide a separate ratings on i) the impact of the CRCP funding only, and ii) the impact of the Chair but disregarding the impact of the funding.

Canada's reputation as a world leader in research, only 70% of other chairholders and 45% of grantees (who have never received a CRCP Chair) agree, and a much larger proportion of the two latter groups disagree (Table XII); the difference in agreement ratings is significant ($p < 0.001$). Interestingly, however, fewer other chairholders agree that their chair or award program has had the same effect as the CRCP, although the difference was not significant ($p > 0.075$).

Table XII Perceived impact of the CRCP on Canada's international reputation in research

	CRCP chairholders (n=958)		Other chairholders (n=142)		Grantees (n=123)	
To what extent to you agree or disagree that...	Agree	Disagree	Agree	Disagree	Agree	Disagree
The CRCP has contributed to Canada's reputation as a world leader in research.*	86%	1%	70%	10%	45%	22%
My award program has contributed to Canada's reputation as a world leader in research.			65%	8%		

Note: *Difference between groups is significant ($p < 0.001$).
Ratings of "agree" and "strongly agree" were combined, as were ratings of "disagree" and "strongly disagree." The percentages include all researchers, even those who did not provide a rating for the category.
Source: Science-Metrix surveys of CRCP chairholders and other chairholders

From the university perspective, a larger proportion of the VPs Research who completed the web survey indicated that the CRCP had had a positive or very positive impact on the visibility of their university (95%) than on its reputation in Canada (88%) or its reputation abroad (77%).

Finding 20: Evaluation informants perceived that the CRCP has clearly contributed to improving Canada's international reputation in research, as well as that of Canadian universities, but further inroads are possible.

Comparative advantages for universities

Ample evidence from several sources demonstrates how the CRCP, including the CFI component, have been beneficial for enhancing the research capacity of universities, including the improvement of infrastructure, leveraging of external funding, and numbers of faculty/researchers and graduate students. Many of these advantages have been touched upon in other sections that discuss how the CRCP has contributed to increasing the attraction and retention of leading researchers (Section 3.1), research capacity (Section 3.2 and the present section), and training of HQP (Section 3.4). To complement these findings, a brief discussion of the main mechanisms through which the CRCP has contributed to comparative advantages is presented here. Overall, VPs Research are very positive when discussing the impacts of the CRCP on their institution, and many consider that the CRCP has brought their university closer to their goal of being a leading research institution in their priority areas. Note that not all of the advantages below were observed with all CRCP Chairs or in all institutions, but they were cited sufficiently often by several sources to merit inclusion.

Increased capacity through infrastructure improvements were often cited by VPs Research and other evaluation informants as being central to the advantages conferred by the CRCP (including via the CFI associated funds). In the web surveys, 84% of CRCP chairholders agreed that the CRCP had contributed to improving the research infrastructure, which is significantly higher than the proportion of other chairholders who believed their own chair or award program had the same effect ($p < 0.001$).

Infrastructure improvements increase universities' ability to attract and retain researchers, leverage additional funds, and generally increase research capacity through the development of state-of-the-art facilities in the relevant areas. They also help to establish or strengthen research centres and clusters that subsequently boost these institutions' national and international reputations for research. All of this can lead to further investments and complementary infrastructure improvements in the targeted areas.

The increased ability to attract and retain leading researchers via the CRCP is also seen as a fundamental motor for further strategic benefits. As seen in Section 3.2, the chairholders themselves are often seen as having a greater capacity to attract external funds for their research programs, and their success allows universities to further build and enhance their infrastructure capacity in strategic areas. University administrators also note that the presence of existing chairholders helps to draw other investigators to join an already vigorous research environment, and thus leads to increased numbers of faculty members or researchers, which form a critical mass around strategic areas. Therefore, chairholders often act as a lynchpin for the area of strategic research focus.

The CRCP can also be used to attract researchers who cross traditional discipline or sectoral boundaries, in some cases even spanning multiple strategic priorities. Some universities therefore make it explicit that chairholders are expected to promote multidisciplinarity and team building through outreach and the building of partnerships. These Chairs are either added to established networks or, in the case of a new targeted area of strength, the first chairholder is asked to help recruit other researchers. Other universities consider that the ability of the CRCP chairholder to foster collaborative research is discipline and personality specific, but may choose to allocate some Chairs in areas where the freedom and stability that the program provides uniquely positions the chairholder to bring disparate scholars together around a common subject. As such, many VPs believe that the program highlights multidisciplinarity, particularly at universities or in departments that already prize and promote an interdisciplinary approach to research. Whether explicit or not, the presence of chairholders often results in greater interaction, collaboration, and interdisciplinary research between chairholders and their colleagues, thus supporting a dynamic research environment at their university.

The fact that top students and other HQP view chairholders as research leaders and desire to be trained by them is another of the most cited benefits of the program, and one that has long-term benefits. Universities note that the CRCP has enhanced their training capacity in key areas of institutional priorities (see also Section 3.4), leading to increased student enrolment in these areas and (in a few cases) to the creation of new graduate programs. More generally, the creation or strengthening of research teams in strategic areas further attracts HQP, and creates an environment in which junior faculty can be mentored by senior researchers in the field. As such, the CRCP supports the recruitment and training of the next generation of researchers in the university's strategic areas.

The presence of CRCP chairholders was also seen by some VPs Research to create an indirect or "halo" effect on the research culture and environment within the faculty or university. Chairholders may serve as examples of exemplary researchers, play a leadership role in their faculties, create new dialogues between faculty members, raise other researchers' perceptions of possibilities for their research careers, and generally "raise the level of research excellence, activity, productivity, and funding." As one VP Research indicated, "Since the advent of the CRCP, ambitious research programs have enjoyed greater institutional encouragement and support, and the level of research excellence and expectation has risen across disciplines." As an example of these increased expectations, another VP

Research found that the scholars at the VP's university "require of themselves (including in Tenure and Promotion criteria, annual evaluation, merit awards, etc.) greater research productivity."

Another indirect effect is the reputational capital associated with the CRCP Chairs. Indeed, many of the university's annual reports to the CRCP describe the enhanced visibility and profile of Chair-led research and programs, as well as the universities at which the Chairs are housed. This increased prestige is considered an asset as it helps to draw in further top-quality collaborators and HQP, leverage additional funding from external sources, and generate opportunities for knowledge translation and global research impact in strategic areas. The fact that many Chairs join initiatives and networks—and organize research conferences and symposia—at local, regional, national, and international scales further increases their visibility and symbolic value. Within universities, departments that comprise several CRCP chairholders also gain in status, as this not only indicates the university's commitment and support for this field of research, but also signals the high level of research being conducted within these departments. As such, universities report that chairholder-led research programs garner more media exposure: chairholders are more often profiled or interviewed, consulted as an expert, or otherwise engaged by major media outlets (publications, periodicals, and television outlets) both within and outside of Canada. The media coverage associated with Chairs is often said to be high, further enhancing the profile and direct impact of the research of the universities and their growth in the area.

Some of the advantages noted above have been felt most strongly in certain types of institutions. For example, many smaller universities found that the CRCP had a significant effect on their research culture, creating an increased focus on research and offsetting their limited resources and infrastructure capacity. In these cases, the CRCP is credited with the attraction or retention of chairholders who might otherwise be recruited by larger institutions that have greater resources for the support of leading-edge research activities. University administrators also see effects on the research culture related to the simple presence of very active researchers (i.e., the chairholders) and research clusters at their institution, as well as the enhanced research and training opportunities enabled by the CRCP. The CRCP was seen as especially valuable in small institutions with significant teaching and service expectations, in which the receipt of Chairs increased the recognition of their faculty's research role. In fact, many of the smaller universities that submitted annual reports claimed that, by allocating them a relatively large numbers of Chairs, the CRCP helped them to transition from a teaching-based institution to a more comprehensive teaching and research-based institution. The research programs and centres established by chairholders also lend credibility to smaller universities' research programs and enhance their profile for research excellence in selected areas. Overall, CRCP chairholders also help to connect smaller universities to—and give them a more substantial presence in—the broader research community.

These effects are not seen in all cases, and even when advantages do emerge, they may not always be felt by all members of the university community, particularly those outside of institutions' selected strategic areas. This may explain why grantees (who have never received a CRCP chair) were significantly less in agreement with statements in the web survey regarding the benefits of the CRCP (see also Question 3.2, Table XII, and Question 6.1). For example, 24% of grantees disagreed with the statement that the CRCP had contributed to improving the research infrastructure at their university, and 9% disagreed that CFI funding associated with the CRCP has similarly contributed to improvements in the research infrastructure; in both cases, grantees disagreed significantly more than

CRCP chairholders ($p < 0.001$). Moreover, only 31% of grantees agreed that "the CRCP has been beneficial for a variety of faculty/researchers in my university, not just the chairholders themselves," which is significantly less than the 80% of chairholders who agreed with this statement ($p < 0.001$).

VPs Research were also not unanimously of the opinion that the objectives pursued by the CRCP matched with the strategic research orientations of their university: whereas the majority agreed (23% answering that these matched to a great extent and 51% to a large extent), 16% agreed to a moderate extent and 5% to a limited extent. While the program-level interviewees generally felt CRCP was a tool that allowed universities to self-select the areas in which to focus in a way that is both strategic and research focused, some university-level representatives commented on how the program favours the physical, natural, and biomedical sciences over the arts and humanities. As such, some representatives from universities without a medical school or which primarily have a liberal arts focus perceived that they are disadvantaged by certain aspects of the CRCP. The teaching role of universities, which most institutions prioritize and value, was also felt to be somewhat excluded from the research focus of the CRCP. While these were not widespread views and perfect consensus among all stakeholders is unlikely, some of the unintended effects of these perceptions are discussed in Section 3.5.

Finding 21: The comparative advantages developed by universities through the CRCP vary, with most highlighting the role of the attraction and retention of leading researchers and infrastructure improvements as the biggest catalysts for increased research capacity in strategic areas.

Question 5.1: How has the requirement to develop strategic research plans (SRPs) assisted universities to develop a comparative advantage?

To qualify for CRCP Chairs, universities must submit a strategic research plan (SRP) outlining the institution's overall objectives and how each Chair will contribute to the achievement of these goals; note that the SRP is a requirement for all CFI programs as well. When assessing nominations, members of the College of Reviewers verify the justification of how Chair nominees align with the university's SRP, and some nominees have been rejected for misalignment. Program-level interviewees expect that the SRPs will be a key tool in strengthening the ability of universities to manage their research activities in a strategic manner. The present section examined data relating to the development and use of the SRPs.

In about 60% of universities (based on web survey data), the introduction of this requirement as part of the CRCP application forced the university to sit down and compose an SRP. About 30% of universities had already been using an SRP prior to the inception of the CRCP; most of these simply adapted the structure of the document to accommodate the new requirements. Usually, the decision was made to identify existing areas of strengths and place the Chairs within these or related areas of research. Universities often aligned their strategic areas to match the opportunities presented to them in their surrounding environments, such as proximity to certain industries or natural resources. Some universities also used the opportunity to identify areas where they felt they were lacking in capacity in order to fill these "gaps." The flexibility of the CRCP design is seen by some VPs Research as being particularly helpful, as it does not impose external criteria on universities' decisions regarding areas of research to target. That being said, seeing the distribution in the allocation of chairs by discipline area, it

may not be surprising that many universities have primarily selected areas of focus in health sciences and in the NSE (see Section 5.2).

A sample of the SRPs was reviewed as part of the case studies. This assessment revealed a great deal of variability in their structure and level of detail: whereas some universities outlined specific fields in which resources (both human and financial) will be focused, others described a general area. For example, one institution identified a certain type of biomedical application as an area in which additional faculty hires and infrastructure investments were planned, with the goal of increasing research output and quality in that area. At another institution, environmental science was identified as a priority area, with a broad objective of increasing their research profile in the area. In the former case, specific departments and subareas of research were identified that would be considered relevant to the development of this strategic aim, whereas in the latter, the description of what relevant research might qualify was less detailed or specific. One main trend was observed in the definition of strategic areas for the SSH fields versus the natural/biomedical sciences and/or engineering fields: in most cases, the former were loosely defined (i.e., as general areas or thematic concepts, such as "Canadian Society") rather than linked to specific sub-disciplines.

However, the tendency to outline very specific versus general areas did not correlate with any particular institutional characteristic (e.g., size, research focus). Nor did this review find an association between the extent to which the implementation of the SRP led to the achievement of CRCP or institutional objectives (as assessed in the case studies), the SRP's structure, or level of detail. For instance, institutions providing very detailed SRPs were no more or less likely to have achieved their stated goals than those with more broadly defined strategic areas. As discussed below, this suggests that it is not necessarily the plans themselves that contribute the most to the comparative advantages associated with the CRCP.

That said, most VPs Research agreed that the SRPs had been a beneficial tool for the development of their research capacity, especially by contributing to their ability to leverage external funding in strategic research areas and in contributing to their infrastructure; additional comments indicated that in many cases this was directly related to the use of the SRP to support successful CRCP and CFI funding applications. For example, the SRP allowed universities to clarify, focus, guide, and prioritize their infrastructure development in the chosen areas, such as through the selection of infrastructure proposals. With regard to their ability to leverage additional funding, most VPs Research described a type of "snowball effect" stemming from the initial SRP-based decisions: by helping them focus resources on and attract excellent researchers and partners in these chosen areas, the SRPs contributed to the universities' ability to leverage funding for future projects in these areas, either via the CRCP chairholder or via initiatives led by a research centre, institute, or cluster. Some VPs Research feel that when areas are focused and well defined, as in the SRP, it bolsters the "sales pitch" for large-scale projects; the SRP also raises the visibility and legitimacy of the projects in the chosen areas. Examples of leveraged funding in areas identified in the SRP include Centres of Excellence, Canada Excellence Research Chairs, grants from federal and provincial agencies (including additional CFI and CRCP funds), and endowments, as well as contributions from industry partners, other universities, and international sources.

The SRPs were also perceived by VPs Research to have assisted in increasing the number of faculty/researchers engaged in related research or the number of students and research staff in these

areas, although to a lesser extent than the assistance provided for infrastructure and leveraging. At the most basic level, universities use the SRP to guide certain recruitment and hiring decisions (for both CRCP and non-CRCP positions), leading to a direct increase in the number of faculty/researchers engaged in related research areas. Some universities also instituted policies by which, for every CRCP Chair, a position was created for an additional researcher in the same area. Initial hires can then form a nucleus around which additional faculty, collaborators, and staff are recruited, and graduate programs can be developed. Students may also be attracted to the research areas developed under the SRP, or by the CRCP chairholders themselves. Finally, grants to support students have been put in place by some institutions in SRP-related areas.

As suggested in the previous paragraphs, the SRPs have also been used in ways that extend beyond the CRCP and the CFI, particularly in providing an opportunity for universities "to take a critical look at their research strategies" or their research agenda, particularly in the case of smaller or younger universities. One VP Research posited that "requiring universities to establish strategic research foci is an underrated benefit" of the CRCP. At another university, CRCP Chairs were allocated in the same area as a Canada Excellence Research Chair to form a synergistic arrangement that the university administration calls "stacking success with success"; this institution perceives the Chairs as opportunities not to be wasted. Yet another has clustered their CRCP Chairs and IRCs to establish the core competency in chosen domains.

Thus, evidence from program- and university-level sources support the finding that SRPs have helped many universities develop their research capacity, both in terms of the CRCP and from a more general standpoint. The case studies show that both small and large universities have been very successful in applying their SRP to recruit or retain leading researchers and create strong research teams in selected priority areas, whereas other institutions (irrespective of size) have less clearly benefited. In some of the less successful cases, the SRP may be either sufficiently expansive in design to be applicable to many research topics or highly focused, but lacks a specific roadmap as to how individual researchers are expected to contribute or execute these objectives, or to what commitments the university would make to support its chairholders. However, seeing the variability in the SRPs and the success with which very different plans have been implemented, it is likely that the plan itself is not essential to this success. Rather, it may be the strategic focus that the CRCP requires in the SRP—combined with the university practices in implementing the CRCP as a whole—that contributes to comparative advantages associated with the program.

The exercise of developing and reviewing the SRPs may also be beneficial in and of itself. Some universities that developed their SRP at the inception of the CRCP have since reviewed its alignment with their Chairs and have worked to develop a more focused and clear plan. Moreover, a number of universities have implemented processes to update and strengthen their SRP as needed. Some university administrators have credited the CRCP as a driving force behind an in-depth review of the university's SRP and a more focused commitment on the part of senior administration to ensure that it meets the needs of all its member constituents with an eye on the long term. Institutions in which the implementation of the SRP had become more or less formalized over the lifetime of the CRCP were also observed, through efforts to improve this process.

The way in which the SRP are implemented in the context of the CRCP also varies between universities. For instance, there was considerable variability in terms of the ratio of retention to

recruitment, in the choice to set up review committees that vet faculty proposals for their strategic fit, and in the decision to allocate Chairs in relatively isolated research areas (albeit one that is peripheral to an area identified in the SRP), as opposed to areas with a demonstrated core competency and performance. Based on the case studies, implementation of the SRP appears to be most effective when the selection of strategic areas stems from an internal consensus, and when the implementation of the plan translates into focused and sustained support either for the enhancement of existing strengths or for the large-scale development of new research teams (e.g., a cluster of several Chairs in a given area).

Indeed, several lines of evidence show that, especially in the absence of a larger commitment on the part of the university, a single CRCP Chair cannot simulate a dense community of scholars where one does not exist. And with regard to strategic capacity building, the VPs Research and researchers alike repeatedly pointed to the importance of having a critical mass of people within an area (which is generally correlated with the intra-institutional support in this area) in order to optimize the likelihood for success of a Chair, as well as the likelihood for the broader success of the research area (e.g., leading to the receipt of a CERC Chair, as seen in some cases). The positive effects of belonging to a cluster or complementary grouping rather than being isolated were strongly touted in the case studies and general interviews by those who experienced such an environment. Similarly, the negative effects of being placed in an isolated (or even hostile) environment were shown to limit the overall effectiveness and development of the chairholders' progress—particularly in the case of Tier 2 chairholders, who sometimes require more mentoring or guidance.

Finally, it should be said here that using the SRP to focus Chairs and other resources on chosen areas may lead to dissatisfaction for administrators and researchers who find themselves in areas that were not retained as "strategic." These and other unintended effects of the program are discussed at greater length under Section 3.5.

Finding 22: The CRCP requirement to develop a strategic research plan has benefited many universities by guiding both their CRCP nominations and their broader strategic decision making.

3.4 Question 6: What has been the CRCP's contribution to the training of highly qualified personnel (HQP)?

Number and types of HQP

CRCP chairholders involved larger average numbers of students and research staff in their research programs than their comparable colleagues, as illustrated by the web survey data (Table XIII). Indeed, CRCP chairholders report having involved significantly more undergraduates, master's students, doctoral candidates, and post-doctoral fellows in the last 12 months, on average, than have other chairholders and grantees[34] ($p < 0.01$); CRCP chairholders also involved more research assistants and technicians than grantees did ($p < 0.01$). This finding suggests that, in having more time and/or resources to support HQP, CRCP chairholders can involve more HQP in their research program than other leading researchers.

[34] "Other chairholders" excludes other chair programs administered by the federal granting agencies (e.g., IRCs). "Grantees" received substantial amounts of research grants from the federal granting agencies but do not hold a chair (CRCP or any other); see Appendix A for details.

Among CRCP chairholders, the federal granting agency of the Chair was associated with significant differences in the proportion of types of HQP that are involved in their research programs (all $p < 0.01$). For example, NSERC chairholders generally involved more undergraduate students than chairholders from the two other councils, more master's students and doctoral students than CIHR chairholders, and more post-doctoral candidates than SSHRC chairholders. SSHRC chairholders also involved more master's students than CIHR chairholders. CIHR chairholders, however, involved more undergraduate students and post-doctoral fellows than did SSHRC chairholders, and more often had research assistants and technicians than chairholders from the other two councils. Moreover, for all five types of HQP, Tier 1 chairholders' research programs involved higher numbers than Tier 2 chairholders ($p < 0.05$), which may be related to the maturity of their research program or to their access to greater levels of financial resources.

Table XIII Average number and types of HQP involved in the research programs of CRCP chairholders and comparable groups in the 12 months prior to the web survey

	CRCP chairholders		Other chairholders		Grantees	
Type of HQP	%	Mean/ CRCP	%	Mean/ other C	%	Mean/ grantee
Undergraduate students*	77%	3.6	69%	2.4	70%	2.2
Master's students*	88%	2.9	81%	2.4	76%	2.3
Doctoral students*	90%	3.7	85%	2.7	86%	2.7
Post-doctoral fellows*	73%	1.8	60%	1.3	61%	1.2
Research assistants and technicians*	73%	2.2	62%	1.7	60%	1.4
Total HQP		14.3		10.5		9.8

Notes: *Difference between groups is significant ($p < 0.01$).
The mean includes all researchers, even those who reported no outputs in the category.
Source: Science-Metrix surveys of CRCP chairholders, other chairholders, and grantees

Intriguingly, the significant differences observed between the three comparable groups in Table XIII disappear when the average number of students who graduated under the direct supervision of CRCP chairholders, other chairholders, and grantees is considered. Indeed, researchers from all three groups saw an average of nearly four students (all types combined) and post-doctoral fellows in the last 12 months, and there were no significant differences when HQP are broken down by type (data not shown). This suggests that CRCP chairholders involved larger numbers of HQP in their general research programs—which obviously includes direct supervision, but may also include HQP involved through the chairholders' collaborators and partners—whereas the average number of students they supervise directly is similar to that of comparable researchers. This also suggests, however, that the CRCP does not enable the direct supervision of more students than do other chair programs or large federal research grants. Differences in the types of graduated HQP across councils and tiers are the same as those observed with supervised HQP (see above), indicating that whether the HQP are under their direct supervision or involved in their research program more broadly, trends related to discipline and career status still apply.

Finding 23: CRCP chairholders involve more HQP in their research programs than do other chairholders or grantees, but all of these additional HQP may not be under the chairholders' direct supervision.

Teaching load

Based on program files, almost two-thirds of universities allow their CRCP chairholders to reduce their teaching load, thereby allowing more time for other activities, including research and the training and supervision of students and research staff; see Section 3.5 for a detailed analysis of the time allocations of CRCP chairholders. The web surveys confirm that other chairholders and grantees spent significantly more time on their teaching duties (21% and 22%, respectively) than did CRCP chairholders (16%) ($p< 0.001$). Furthermore, CRCP chairholders spent significantly more time on student and research staff training and supervision (20%) than did other chairs (17%) ($p< 0.001$). Therefore, across the CRCP, the reduction in teaching load has allowed researchers to spend less time in the classroom and more time developing the research skills of the HQP they involve in their research programs.

In the focus groups, few HQP were in a position to comment on the teaching loads of their supervisors relative to researchers without a Chair (e.g., if they had only worked under the supervision of a chairholder) but a small number did indicate that they had better access to their supervisor because of teaching release. However, some HQP found that their supervisor spent less time on campus during times when the latter did not have any courses to teach or that chairholders were often kept busy by the many other non-teaching-related demands on their time (e.g., grant writing, administrative tasks, travel for conferences; see also Section 3.5). In the absence of the chairholder, supervision and training was generally provided by research assistants or by senior students and post-doctoral fellows, although chairholders could usually be reached by email. Most students in the NSE and health sciences fields also reported that weekly or bi-weekly group meetings with the supervisor contributed positively to their training, although the time offered to individual students often varied with the size of the research group (i.e., the larger the team, the less time the chairholder has for each individual member). Overall, HQP were of the opinion that the CRCP had relatively little impact on the time the supervisors made available for their students and staff; this was seen as more of a personal choice, with teaching release allowing chairholders to have more flexibility in determining the type of contact they choose to offer their HQP.

From the perspective of discipline areas, both SSHRC and NSERC chairholders devoted a greater proportion of their time to teaching duties than did CIHR chairholders; this may also be related to the fact that the CIHR-associated chairholders include clinical scientists based in university-affiliated hospitals and research centres, who less often have heavy teaching loads to begin with. Interestingly, CIHR chairholders would ideally spend more time on teaching duties than they actually do, whereas SSHRC and NSERC chairholders would ideally spend less time on teaching related tasks ($p< 0.001$).

More time was spent on supervision of student and research staff by NSERC chairholders, followed by CIHR and SSHRC chairholders; these differences are significant ($p< 0.001$). The HQP focus group data suggest that this is also likely related to the way in which research is conducted across these disciplines, with research in the NSE and health sciences fields more often being lab-based and research-led, and with research in the SSH more often being conducted independently by students. In all three disciplines, evidence was found of research staff playing a role in student supervision, so it is also likely that in disciplines where research assistants and technicians are more common, like in health sciences research (see above), a greater proportion of direct supervision of students is conducted by staff than by the chairholder. Meanwhile, Tier 2 chairholders devote a significantly larger proportion of

their time to teaching duties than Tier 1 chairholders ($p < 0.001$), but both allocate 20% of their time to supervision of HQP. This last finding is also supported by the focus groups, which suggest that senior researchers tend to have more responsibilities outside of their research program than do junior researchers; these extra responsibilities would therefore take up the time freed by teaching release (see also Section 3.5).

The surveys also assessed the way in which the CRCP affected the time allocated by researchers for various tasks: CRCP chairholders and other chairholders indicated whether they spent more or less time on these tasks since they had obtained their Chair. Among CRCP chairholders, 44% indicated they spent less time on teaching duties and 47% indicated they spent more time supervising and training students and research staff; this is a significantly different effect from the rates reported by other chairholders, of which 34% spent less time on teaching duties and 38% spent more time with HQP ($p < 0.01$). SSHRC and NSERC chairholders spent significantly more time on student and staff supervision after they received their Chair compared with CIHR chairholders ($p < 0.001$), but there was no difference between councils (or tiers) in the effect of the CRCP on time spent on teaching duties.

In open-ended questions relating to the impact of the CRCP on time allocations, many chairholders praised the reductions in their teaching load associated with the CRCP, noting that it allowed them more time for students, particularly for training and mentoring graduate students in their field, but that the main benefit was for their research. The same benefits were cited by other chairholders whose award programs also included teaching release. Several CRCP chairholders were critical of institutions when these did not grant them any teaching release, and several stressed that teaching loads should be reduced (or reduced further) to allow for more research time, as befitting the objectives and high expectations attached to the CRCP. Inter-university variability in the policies relating to teaching release was frequently noted, particularly by those whose universities did not grant as much teaching release as others.

Interestingly, some CRCP chairholders pointed out that teaching (at the graduate level, undergraduate level, or both) was a valuable activity, and that they either chose to teach or were not unhappy about their university's extant teaching requirements. For example, the value of access to HQP via courses was noted for recruitment purposes (especially in relation to graduate courses or programs in the same research area). Some HQP also saw some advantages associated with their supervisor teaching at least a small number of courses: several indicated that they had acquired an interest for their graduate research topic or met their graduate supervisor through a course taught by a chairholder, and others benefited from increased teaching and assistantship opportunities through the course taught by their supervisor. Nonetheless, several informants indicated that finding the balance between time for teaching and time for research (or other research-related tasks) was often a challenge.

Finding 24: CRCP chairholders are generally more available for HQP supervision and training, especially when teaching release is offered by their university.

Question 6.1: Has the CRCP contributed to universities' capacity to attract and retain the highest-quality students from Canada and the world?

This question focuses on the issue of attraction and retention of high-quality students, but will also examine the benefits received by HQP who are supervised by chairholders, particularly with regard to opportunities offered through their training. These opportunities are, in turn, expected to produce

higher-quality personnel. Some of the benefits of chairholders for HQP have already been touched upon in Section 3.3, since the presence of chairholders increases the overall research capacity of universities, including these institutions' ability to train the next generation of researchers. For instance, universities have linked the CRCP with increased offerings in graduate-level programs in strategic fields, as well as with the development of research centres or the improvement of infrastructure. They can also act as a draw for high-quality students above and beyond the presence of the leading researcher in a given field. This section examines these findings in greater detail from the point of view of the HQP themselves, as well as on the opportunities offered to HQP as reported by their supervisors.

Two data collection instruments were used to gather evidence directly from HQP who have worked with CRCP chairholders: the case studies and the four HQP focus groups conducted in universities across Canada. First, it must be said that almost all of the HQP who provided input were very pleased with the training they had received as members of their supervisor's research group. In terms of attraction and retention, all students cited either their interest in their supervisor's area of research and/or their supervisor's reputation or past expertise in the field as the primary reasons for selecting that particular individual as their graduate degree or fellowship advisor; the CRCP's effect is therefore indirect in this regard, in increasing the prestige and success of the chairholders' research programs, for example. About half of the students had previous contact with their supervisors (e.g., as a student in their class or via another professor) or had taken the time to meet them before choosing to pursue their graduate studies with them; in these cases, the good rapport, communication, and availability of the chairholder was very often a factor in their selection that rated above and beyond the CRCP. In fact, few students—particularly those from outside of Canada—were aware that their potential advisor held a CRCP Chair or knew what this title actually meant.

Factors that could limit the attraction or retention of HQP included the location of the university, although many HQP were willing to relocate for the "right" supervisor. Other characteristics of the host university, such as size or a lack of graduate programs in their research area, could also limit the attraction of highly-qualified students. As above, these factors were not directly linked to the CRCP.

There is evidence that the CRCP had a direct effect in attracting and retaining students, such as in providing access to rare or state-of-the-art facilities and equipment. Indeed, the HQP were often swayed by the assurance of funding for research (and to a lesser extent, the possibility of supplementary financial support for students); by the greater opportunities for publication, collaboration, or conference participation; by the quality of the research team (including the presence of post-doctoral fellows and research staff); and by the stable and enriched research environment associated with longer-term planning and/or with the opportunities for interdisciplinary research that are often facilitated by the CRCP. More generally, the attraction may stem from the fact that CRCP chairholders generally have the demonstrated excellence that HQP look for in an advisor. In the case of some post-doctoral fellows and research assistants, the CRCP was also directly responsible for the creation of the laboratory or research centre where they did their work, and the CRCP contributed to their salary. A few students also felt that they were more successful in obtaining external funding compared with other students because their supervisor had a CRCP, although this could simply be because CRCP chairholders may tend to attract higher-quality students.

Indeed, in the opinion of several VPs Research, a CRCP Chair increases the ability of researchers to attract high-quality HQP from within and outside of Canada. Survey data from CRCP chairholders and other chairholders align with this perception, as significantly more CRCP chairholders found that the CRCP contributed positively to their ability to attract more students and research staff, and higher-quality students and research staff compared with the impact of the other chair programs as perceived by other chairholders ($p < 0.001$; Table XIV). Note that grantees indicated that their federal funds helped them attract more and higher-quality HQP compared with chair programs, as perceived by CRCP or other chairholders ($p < 0.001$), likely because a greater proportion of federal grant funds is typically allocated to student and research staff salaries than the CRCP funds. Likewise, the CRCP funding was seen to enhance the quality of the training of students and research staff more than funding provided by other chair programs but less than federal grant funds ($p < 0.001$). Tier 1 chairholders reported a more positive impact of CRCP funding on their ability to attract high-quality students and research staff, as well as on the quality of their training, than did Tier 2 chairholders ($p < 0.05$), but this difference disappeared when considering the effect of the CRCP *excluding the funding*,[35] once again pointing to the importance of funds in terms of enhancing the CRCP chairholders' research capacity (see also Section 3.2).

Table XIV Perceived impact of CRCP funding, funding from another chair/award, or federal research grant on research quality and impact

	CRCP chairholders (n=969)	Other chairholders (n=145)	Grantees (n=125)
Impact of funding on…	Positive or very positive	Positive or very positive	Positive or very positive
Your ability to attract more students and research staff*	80%	66%	94%
Your ability to attract higher quality students and research s	74%	60%	86%
The quality of the training of your students and research sta	73%	59%	94%

	CRCP chairholders (n=967)	Other chairholders (n=145)
Impact of CRCP/other chair (excluding funding)	Positive or very positive	Positive or very positive
Your ability to attract more students and research staff*	80%	56%
Your ability to attract higher-quality students and research staff*	77%	59%

Notes: *Difference between groups is significant ($p < 0.001$).
The percentages include all researchers, even those who did not provide a rating for the category.
Source: Science-Metrix surveys of CRCP chairholders, other chairholders, and grantees

More generally, 82% of CRCP chairholders felt that "the CRCP has contributed to the attraction of students and research staff at their university," whereas only 68% of other chairholders and 41% of grantees agreed with this statement in relation to the CRCP. The tendency of non-CRCP researchers to be less positive about the impact of the program has been noted previously (see Table XII and Section 3.1, Question 3.2). In this case, a greater proportion of other chairholders tend to see a greater impact of the CRCP in this regard (68%) than their own award program (60%), but the difference between the two ratings is not significant ($p > 0.06$). Nonetheless, all of these data suggest that the CRCP does play a role, albeit an indirect one, in the attraction of high-quality students to participating universities.

[35] In the web survey, chairholders were asked to provide a separate ratings on i) the impact of the CRCP funding only, and ii) the impact of the Chair but disregarding the impact of the funding.

Finding 25: The CRCP supports the attraction of high-quality students and research staff to Canadian universities, such as by contributing to the presence of leading researchers or by enhancing the research and training environment.

With regard to the benefits of studying or working with a CRCP chairholder, the findings in Table XIV suggest that the quality of the training of students and research staff may also be enhanced by the CRCP. While most HQP indicated that the high calibre of individuals that they worked with certainly influenced the quality of development and training they received, few indicated they thought that this was a direct result of the CRCP Chair. Again, most felt the two elements were related but not causal—i.e., since a researcher needs to be an excellent researcher to get a Chair, working with a chairholder means you will have an excellent researcher as your advisor. Moreover, most HQP interviewees or focus group participants had limited knowledge of how the program functions and/or details in the administration of funds. As such, they were often unsure if the resources or infrastructure that contributed to their overall experience were provided by the CRCP (including CFI-associated funds) or by other research funds obtained by their supervisor. Nonetheless, the following data do support indirect and possibly direct benefits of the CRCP for the training of HQP.

Collaborative opportunities for HQP

Most HQP, whether in the case studies or in the focus groups, cited that they had benefited from opportunities to connect with other highly regarded scholars in their area through their advisor's collaborative or professional networks. HQP felt that both national and international collaborative opportunities were very important, not only for the research they conduct under the supervision of the chairholder, but also for expanding their own network and enriching their student experience in a way that will be helpful in their future careers. For example, HQP report being able to save time and resources through access to the expertise of other researchers (including, occasionally, through co-supervision and training under other researchers in Canada and abroad) and through co-publication, thereby increasing the quality and productivity of their work, as well as expanding their research horizons and experiences through exposure to other high-quality researchers.

Moreover, through access to their supervisors' networks, HQP have gained contacts that can be helpful in finding a subsequent position. Indeed, while graduates of chairholders are often still in the relative beginning of their careers, some instances were seen of former students of chairholders having easily gained positions in the academic, industrial, government, health, and not-for-profit sectors. After graduation, some HQP also continued to work on projects with their former supervisors, thereby becoming collaborators themselves.

Web survey data support the conclusion that the CRCP is associated with greater opportunities for students and research staff to participate in national or international collaborations. Indeed, 63% of CRCP chairholders say they were able to offer more of these collaboration opportunities to their HQP since they became chairholders, compared with 45% (national collaboration) and 51% (international collaboration; $p < 0.001$) of other chairholders (Table XV). Among CRCP chairholders, more SSHRC chairholders reported increases in national collaboration opportunities than did CIHR chairholders ($p < 0.05$) since they received their Chair; similarly, more SSHRC chairholders reported increases in international collaboration opportunities than did chairholders from the two other councils ($p < 0.001$). While more Tier 1 chairholders reported these types of increases than did Tier 2 chairholders

($p < 0.001$), the latter still compared favourably with other chairholders, which include both senior and junior chairholders (data not shown).

These enhanced collaborative opportunities were often said to be facilitated by the chairholder's reputation, by their existing national and/or international network, and by their links with researchers in other disciplines. Some chairholders were said to recognize the importance of collaboration for the HQP they supervise and thus create or take advantage of networking opportunities (i.e., at meetings or conferences) to introduce their students to other members of their network, and to encourage them to set up with own collaborations. When the CRCP chairholder belonged to a network, to a cluster of Chairs, or to a research centre or institute, this was also seen to create additional opportunities to benefit from collaboration and even co-supervision, including across disciplines and sectors. In addition, the CRCP (or other research funds) can also help support expenses for invited scholars to give workshops, seminars, and talks to chairholders' research staff and otherwise increase their contact with HQP.

Table XV Perceived impact of the CRCP or other chair programs on academic and professional opportunities for students and research staff

	CRCP chairholders (n=970)		Other chairholders (n=146)	
	Since you became a chairholder		*During the period of your award*	
How often have the students and research staff working under your supervision had the opportunity to:	More	Less	More	Less
Collaborate with other leading researchers in Canada?*	63%	1%	45%	2%
Collaborate with other leading international researchers?	63%	2%	51%	1%
Write proposals?	35%	2%	33%	2%
Write papers?	56%	2%	53%	1%
Present their findings at national conferences?	57%	2%	54%	2%
Present their findings at international conferences?	63%	2%	51%	1%

Notes: *Difference between groups is significant ($p < 0.001$).
Ratings of "more" and "far more" were combined, as were ratings of "less" and "far less." The percentages include all researchers, even those who did not provide a rating.
Source: Science-Metrix surveys of CRCP chairholders and other chairholders

Finding 26: CRCP-associated students and research staff report many beneficial national and international collaboration opportunities. International collaboration opportunities, as reported by chairholders, are more often enhanced by the CRCP than by other chair programs.

Professional and presentation opportunities for HQP

CRCP chairholders can also offer other types of academic and professional opportunities to their students and research staff, such as the writing of proposals or papers, or presentation opportunities at conferences. As shown in Table XV, in the web survey, the CRCP was associated with more presentation opportunities at international conferences by 63% of CRCP chairholders and by more opportunities to write papers and present at national conferences by more than half of all the chairholders. The opportunities to participate more frequently in the writing of proposals also increased but for only a third of chairholders.

More Tier 1 chairholders reported these types of increases than did Tier 2 chairholders ($p < 0.001$), suggesting that more senior researchers are in a better position, financially or otherwise, to offer these opportunities to their HQP. Moreover, chairholders in the SSH reported greater increases in the opportunities to write papers, and for national and international conference opportunities, than did CIHR or NSERC chairholders ($p < 0.05$), whereas more SSHRC and CIHR chairholders reported increases in proposal writing opportunities than did NSERC chairholders ($p < 0.001$). This ties in with comments made by a few informants, in that the advantages of the CRCP for HQP might be amplified in the social sciences, where research funding and graduate student support is harder to come by than in the natural or health sciences. Thus, CRCP funding might go further in the SSH when it comes to providing students and staff with valuable professional and academic opportunities.

While none of these increases were significantly greater than those indicated by other chairholders in the period since they received their award, these increased opportunities often do confer benefits upon the students and research staff who are provided these opportunities. Generally, HQP who did not have these opportunities indicated that they would have benefited from having them.

For example, several HQP praised their chairholder, either through direct coaching or in setting up technical writing workshops, for their enhanced ability to write (including writing in English) and to "sell something to a journal, to a peer-reviewer, to a conference." The CRCP relieved some students of teaching and assistantship duties, giving them more time to focus on their research and be more productive in terms of writing papers, or facilitated the participation of students in research projects beyond their graduate project (including collaborative projects), which can also lead to further publications. More generally, chairholders were said to strongly encourage the writing and publishing of papers and other types of dissemination, and provide feedback on potential topics and angles of research papers.

As indicated in Table XV, increases in opportunities to write proposals were more limited (particularly for more junior students), but often took the form of requests for input from students and research staff (e.g., research summaries, ideas for future research questions and projects). A small number of HQP highlighted the benefits they have experienced in working on proposals that "have actual stakes involved" (instead of attending a grant writing workshop, for example).

In terms of opportunities to attend and present at national or international conferences, almost all of the HQP who participated in interviews and focus groups indicated that they had benefited from these opportunities. Here, more direct benefits of the CRCP were seen, in that award funds were sometimes used to pay for conference or travel fees, whereas invited speakers could be supported by CRCP funds. Again, chairholders expected and encouraged students to present their research at conferences, and many students indicated that they were sent to at least one international conference during their degree program—in some cases, once a year or more. On a related topic, some chairholders also encouraged their students to participate in workshops, paid for training sessions (including training on CFI-funded equipment), and invited HQP to participate with them in the organization of conferences and symposia.

A number of other skill-building benefits of the CRCP were noted for HQP, such as teaching opportunities and the chance to "supervise more junior students while being supervised." Certain chairholders adopted a strong mentorship role, coaching their HQP in how to design research projects,

how to present themselves in an academic context, how to develop leadership and interpersonal skills, and how to be successful researchers and academics in general. In fact several HQP spoke of how they were inspired by their supervisor's work ethic and overall excellence as researchers. While these qualities are not necessarily associated with the CRCP, the overall positive feedback of HQP regarding their supervisor once again supports the assessment that chairholders are high-calibre researchers and play an important role in the training of the next generation of leading researchers.

Finding 27: HQP report numerous professional and academic benefits from opportunities offered by CRCP chairholders, especially in the form of support, encouragement, and training in knowledge dissemination via papers and conferences.

Question 6.2: How has the CFI component contributed to the capacity to train HQP in collaboration with the CRCP?

Multiple lines of evidence support the conclusion that the CFI component has enhanced both the attraction of HQP, as well as the quality of their training. As seen for the attraction and retention of leading researchers and for research quality, the CRCP and its CFI component were seen to act synergistically in creating a better research environment for HQP.

About 80% of CRCP chairholders surveyed indicated a positive impact of CFI funding on their ability to attract students and research staff, and 84% found that this funding allowed them to improve the training of these HQP; this is significantly greater than the 73% of CRCP chairholders who attributed a positive impact of CRCP funding on this outcome (see Table XIV; $p < 0.001$). Interestingly, the impact of CFI funding on HQP training was rated equally highly by chairholders across all three federal funding councils and both tiers.

Many illustrations of the impact of the CFI component on HQP training were collected in the case studies and HQP focus groups. For example, HQP were trained in the latest methods using state-of-the-art instruments and equipment—which some HQP pointed out were not readily available in most other laboratories in Canada. In other cases, particularly in the SSH, superior office space, access to computers and software, and other useful research facilities (e.g., documentation centres, interview rooms with audio-visual equipment, etc.) were found to be very beneficial to their training and their research environment. Sometimes these facilities were provided by the department rather than through a CFI-funded initiative, but HQP working with chairholders who did not receive CFI funding did not generally cite infrastructure as a benefit to their training. Conversely, when issues with lack of equipment or facilities arose, this was generally regarded as a problem at the university level or was related to the fact that the CFI previously did not provide support for the maintenance costs of the CFI-funded equipment. Note that the CFI has already responded to address the latter issue.[36]

As a final point, the draw of CFI-funded facilities and equipment was mentioned by several CRCP-associated HQP when asked what attracted them to their supervisor. As a whole, CFI-funded facilities and equipment allowed HQP to be more productive in producing and disseminating their research results in peer-reviewed papers and in conferences.

[36]In 2009, the CFI policy was changed and the Infrastructure Operating Fund (IOF) is now included with all CRCP awards (IOF equals 30% of award). This was applied retroactively to all CRCP awards granted since October 2005.

Finding 28: The CFI component of the CRCP enhances the training of HQP by allowing them access to state-of-the-art equipment and facilities—which also serve to attract high-quality students—and by increasing their productivity.

3.5 Question 7: Has the CRCP contributed to any unintended effects (either negative or positive)?

As expected, questions on the effects of the CRCP generated strong opinions from both those who have benefited from it and non-CRCP researchers. As noted in previous sections, non-CRCP researchers are more critical of the program and its impacts on the research environment of universities, although it should be highlighted that many researchers who have not directly benefited from the CRCP praise the program and its impacts. Meanwhile, CRCP chairholders, VPs Research, and program-level respondents were generally very positive, although both groups raised some concerns about unintended effects of the program that could occur. Many, if not most, of the more negative unintended effects were seen to result from the way in which universities implemented the CRCP, more specifically the variations in policies and practices for teaching release, allocation of funds (including the portion retained by the university for administrative fees), transparency/communication, and recruitment/nomination/renewal strategies (see Section 5.1, Question 9.1).

This section examines the more general effects of the CRCP, with the caveat that these effects can sometimes be more or less prevalent based on the delivery of the program at the university-level. Effects of program design on equity issues, which unintentionally became an issue early on in the CRCP's lifetime, are covered in Section 6.1, whereas effects of the allocation of Chairs by discipline are covered in Section 5.2.

Several positive effects of the CRCP, particularly those relating to the comparative advantages of certain departments and universities, have already been discussed at length in Section 3.3. However, they are mentioned again here because several types of stakeholders noted how the presence of CRCP chairholders on the one hand, and the focus on strategic research areas on the other, had unexpectedly strong direct and indirect effects that benefited universities, particularly small universities. However, the present discussion will focus primarily on the negative effects of both the presence of CRCP chairholders and the focus on strategic research areas, as well as the time allocation of chairholders. As the effects of the CRCP on chairholders' reputations inform all of the subsequent effects discussed in this section, the review will begin on this point.

Unintended effects on the reputation/status of chairholders

A slightly unusual aspect of the CRCP, compared with other federal funding programs, is the focus that is placed on individual chairholders by the program and in the media. Indeed, in looking at the CRCP website, one gets the impression that the program's communication strategy is centred on the chairholders, their faces, and their research success stories, rather than on the program as a whole; this has also been noted by an independent study that examined the marketing and branding of Tri-Council programs.[37] While this approach appears to have been successful at creating a brand for the program, it has also created the impression that the CRCP is primarily about its chairholders—as it presents chairholders as "stars"—and less about Canadian universities. CRCP chairholders, Canadian

[37]Hickling Arthurs Low, 2009. *Review of the Framework for the Tri-Council Programs*. Draft report, p. 31.

universities, and even the Canadian research enterprise benefit from this added recognition, status, and visibility, as discussed in Section 3.2, and as very often highlighted by the chairholders themselves when asked about the impact of the CRCP. However, it also can lead to resentment among non-CRCP researchers, and draws a clear line between these two groups—a line that has been felt both in terms of prestige and resources.

Indeed, as the CRCP confers certain advantages to chairholders—such as increased access to infrastructure, funding, and other researchers, as well as teaching releases and other benefits—it is sometimes perceived as having created a situation of "haves and have-nots" in certain departments, faculties, and institutions, and even across Canada. This has led to a certain level of resentment on behalf of non-CRCP researchers. Compared with CRCP chairholders, significantly more grantees agree that the CRCP has "resulted in decreased morale among faculty due to the segregation of the faculty group," that it has had a "negative impact on non-CRCP faculty due to greater concentration of university resources among CRCP chairholders," and that it has "made it difficult for non-Chair researchers to attract or retain students and research staff" (Table XVI, $p < 0.001$). VPs Research responses tended to align more with those of CRCP chairholders, but a slightly higher proportion noted the potential for negative impacts on non-CRCP faculty.

Additional comments provided in response to the open-ended questions in the other chairholder and grantee surveys, as well as in various interviews, provide additional examples of the ways in which the CRCP is perceived to have had a negative impact on non-CRCP researchers and on the broader academic community. A frequent comment was that the lesser teaching or administrative load offered to CRCP chairholders has correspondingly increased the load on non-CRCP faculty—which further reduced the time the latter have for their own research programs—and contributed to feelings that non-CRCP researchers were being used to prop up the chairholders.

Finding 29: In some cases, the lesser teaching or administrative load offered to CRCP chairholders can translate into increased load on non-CRCP faculty.

Others noted that, rather than being "team players" and collaborating with other members of their departments or faculties, some CRCP chairholders tended to isolate themselves (and their resources), either within their research clusters/centres or within their own chairholder-led group. Many of the non-CRCP stakeholders who observed that chairholders were being treated as "stars," as well as chairholders who felt that they deserved to be treated as such, spoke in terms of "us" and "them," indicating that resentment and divisions were perceived by both sides. Other frustrations also resulted from a lack of understanding within the faculty about why certain researchers were nominated for Chairs, which stems from broader transparency issues at the university level.

Table XVI Perceived unintended impacts of the CRCP, including on non-CRCP faculty

	CRCP chairholders (n=958)		Grantees (n=123)		VPs (n=123)	
To what extent to you agree or disagree that…	Agree	Disagree	Agree	Disagree	Agree	Disagree
The CRCP has been beneficial for a variety of faculty/researchers in my university, not just the chairholders themselves.	80%	3%	31%	34%	88%	7%
CRCP Chairs are consistently awarded to leading researchers in their respective fields.	75%	8%	41%	41%	79%	12%
The CRCP has made it difficult for non-Chair researchers to attract or retain students and research staff.	2%	80%	22%	47%	5%	79%
The CRCP has had a negative impact on non-CRCP faculty due to greater concentration of university resources among CRCP chairholders.	4%	74%	42%	27%	14%	72%
The CRCP has resulted in decreased morale among faculty due to the segregation of the faculty group.	9%	69%	45%	33%	14%	65%

Notes: Ratings of "agree" and "strongly agree" were combined, as were ratings of "disagree" and "strongly disagree." The percentages include all researchers, even those who did not provide a rating.
Source: Science-Metrix surveys of CRCP chairholders, grantees, and VPs Research

That being said, many benefits of the CRCP on university faculty beyond the chairholders have also been noted by many stakeholders, including several non-CRCP researchers (see Section 3.3 and Table XVI), which supports the assessment that negative impacts do not occur for all chairholders and in all departments, faculties, or institutions. Adverse effects should be acknowledged as an occasional unintended effect of the program, especially if solutions can be found to alleviate these effects. Some universities have also taken steps, such as developing a more extensive salary structure, to directly address concerns about morale or equity issues affecting other scholars.

On a related note, many HQP noted that the status of the Chair added value to their training in unexpected ways, in addition to the opportunities described in Section 3.4. Indeed, "excellence by association," or the assumption made by other researchers that HQP are of high quality because they are supervised by a CRCP chairholder, was a positive impact often mentioned in the HQP focus groups, to the general agreement of other participants. This increased credibility was seen as giving an advantage to HQP in terms of access to other researchers and for future employment prospects. Several HQP also spoke highly of the motivational and instructional value of working closely with a top researcher (sometimes described as a "role model").

Finding 30: The status and visibility conferred by the CRCP can add value to the positive impacts experienced by chairholders and their colleagues, institution, and HQP. However, the "star" status and the benefits associated with the Chair occasionally also lead to unintended effects on the morale and research programs of non-CRCP faculty.

The validity of this dividing line between CRCP and non-CRCP faculty may be somewhat artificial, as many informants pointed out that many leading researchers in Canada do not hold a CRCP Chair, and not all stakeholders agree that CRCP Chairs are consistently awarded to leading researchers in their respective fields (Table XVI). Indeed, while CRCP chairholders, as a whole, are leading researchers within Canada (as demonstrated by the bibliometric analysis in Section 3.2), there are very likely some

other researchers in Canada—and even more so abroad—who are equally or more qualified for a CRCP Chair than current chairholders.

Some interviewees and survey respondents, including CRCP chairholders themselves, also suspected that some chairholders had been selected for political reasons rather than for reasons based on strategic/research excellence criteria, and claimed that some under-performing chairholders had been renewed; these perceptions (even if untrue or unverified) were seen to undermine the integrity of the entire program. The selection of an individual chairholder—as with any hire or promotion—is a complex process and can lead to questions surrounding the final choice of candidate(s). This is particularly true in cases where there is a lack of transparency (be it perceived or real) in the recruitment and nomination processes. The visibility of the CRCP increases the likelihood that members of the research community may raise such questions. These appear to be mostly isolated reports, but further verification of these claims is outside of the scope of this evaluation, especially since, under the current program design, there are limited mechanisms that can be used to verify whether the nominees who were put forward by universities were the best candidate among those assessed by the university. Further studies would also be required to verify anecdotal claims that some chairholders are being renewed without merit; this issue had not been identified in the initial study design exercises and any relevant available data on this matter were not collected.

Unintended effects on unsuccessful and non-renewed chairholders

Conversely, regarding the status associated with the CRCP Chairs, there appear to be unintended negative effects on some researchers whose application for a Chair was unsuccessful, particularly those already within the nominating institution or who had already moved to the nominating institution in anticipation of receiving a Chair. These unintended effects were observed in the interviews and case studies of unsuccessful applicants. It should be noted here that many unsuccessful candidates re-apply (a maximum of two re-submissions are permitted by the CRCP) for a Chair, and about one-quarter are successful in a subsequent application. Overall, the success rate of nominations is relatively high: 87% for new or resubmitted applications (2000–2008 period; data for 2008 are incomplete), with approximately over 200 nominated researchers having never been successful in this process.

Concerns were also raised in other documents, interviews, and survey comments about the repercussions on researchers if their Chair was not renewed, whether this decision was made by the university, by the CRCP, or as a consequence of the reallocation of Chairs among universities. The success rate of renewals who reach the CRCP peer-review stage is 99% (2000–2008 period; data for 2008 are incomplete), so this situation would most likely occur for chairholders who were not renewed at the university level. With regard to the high success rates of both new and renewal applications submitted to the CRCP, it could not be determined using the available data whether this finding indicates that universities systematically select excellent candidates or whether the CRCP review process is not effectively rejecting lesser quality candidates.

The examples that were examined (e.g., as part of the case studies) reveal that not receiving or losing a Chair reduces researchers' abilities to maximize their research potential, both due to subsequent access to fewer resources and reverberations within the academic community and among collaborators. Moreover, if the academic community perceives that having a CRCP Chair "tells others that Canada

understands what you're doing and recognizes it," then the perception of researchers who are rejected by the program can be the exact opposite.

Whether for new Chairs or renewals, the nomination of the best possible candidates by universities (and ensuring their clear alignment with the SRP) is therefore important for not only maintaining the integrity of the program (see above with regard to the perceived quality of chairholders), but also for avoiding unintended negative effects of the rejection of the application by the CRCP on the applicants' research programs. The latter reason is especially important if their nomination or renewal is refused for reasons of misalignment with the SRP or for reasons relating to CRCP administration (i.e., reallocation of Chairs, changes in CRCP guidelines) rather than because of issues with the quality of their research.[38]

Importantly, the CRCP has revised its program guidelines, allowing chairholders to retain their titles for the duration of the term in instances of termination because of reallocation (see Section 5.1)—a change that, according to universities, has helped to mitigate hard feelings and associated retention challenges. The corridor of flexibility provided in the "Chairs toolbox" also allows universities to adjust their Chair allocations so as to minimize the loss of occupied Chairs. Moreover, chairholders can also retain their CRCP title during the period between the Chair's end date and the notification of renewal decisions in cases where administrative delays may cause a break in the funding.

Unintended effects on external recruitment vs. retention strategies

In terms of the effects on the research environment of using CRCP Chairs for external recruitment versus retention, views were very mixed. On the one hand, giving universities Chairs to attract leading scholars from other Canadian institutions or abroad is seen as one of the main ways to increase their research capacity, as well as that of Canada's, and it does so much more effectively than offering the Chair to a researcher who did not intend to leave the institution.

On the other hand, seeing the prestige associated with the Chairs, passing over internal and highly promising or world-class talent could lead to the devaluation (or, in some cases, the departure) of excellent researchers, and it does not guarantee that the external recruit (for whom the university is likely competing with several other universities in a position to offer a Chair or another attractive package) will be of equal or better quality. Top-level researchers who were offered a CRCP Chair at another university and who chose not to relocate for professional and/or personal reasons therefore prevented the practice of moving or poaching researchers between Canadian universities (i.e., "shuffling the deck"; see Section 3.1, Question 3.2), but consequently lost all the CRCP benefits and potentially increased their resentment of the program. Some other chairholders who were offered a university research chair with similar benefits as the CRCP (often these are modeled on the CRCP) indicated that this may have helped avoid some of these unintended effects of using the CRCP Chairs primarily or exclusively for external recruitment.

Finding 31: The "flip side" of the prestige and benefits associated with the CRCP Chairs is the potential for repercussions on researchers whose CRCP application is rejected, on those whose Chair is not

[38] The CRCP has implemented a process called "Emerging Negative Decision" for renewals to give universities the opportunity to provide supplementary information to address the concerns of peer reviewers in the case of nominations that are not recommended for support for review by the Interdisciplinary Adjudication Committee before the final decision is made.

renewed, or on top researchers who are not offered a Chair, especially if these events occur for strategic or administrative reasons rather than as a reflection of the quality of their research.

Unintended effects on leveraging of additional funds

The last unintended impact relates again to the status of the Chair, this time with regard to leveraging. As shown in Table IX, about 3% (27 individuals) of chairholders indicated that the CRCP has had a negative impact on their ability to leverage additional research funding. Further comments explained that the funding and prestige associated with the CRCP might actually work *against* chairholders in this regard, particularly when applying for research funding through the peer-review process. Indeed, these comments suggested that having a CRCP Chair could create a bias against chairholders, especially if reviewers mistakenly believe that a large portion of the Chair award can be used to fund research (i.e., if the CRCP Chair award is counted under "funds currently held" in the grant application but is used primarily or solely for salary support). While this unintended impact is likely infrequent, given the leveraging success of chairholders, no data were available to objectively measure if or in which circumstances this type of bias was occurring. Interestingly, this type of bias was also perceived by some other chairholders.

On a side note relevant to the issue of funding, there were also some mentions of negative impacts when, having obtained a CRCP Chair (including CFI-funded infrastructure), chairholders unexpectedly struggled to obtain additional operating funds due to: a) delays in setting up their facilities and their research program, b) falling success rates for research grants (especially in the CIHR-funded disciplines, where the competition for funding appears to be increasing), and c) lack of familiarity/reputation with the Canadian grant system (in the case of chairholders recruited from outside Canada, which may also be related to a lack of information or support provided by the host university). A few chairholders also criticized the lack of grants or funding opportunities to ensure the maintenance of CFI-funded equipment. These issues are discussed at greater length under Question 9.0 (Section 5.1).

Unintended effects on chairholders' time allocation

As discussed in Section 3.4, the teaching release that is provided to CRCP chairholders by some—but not all—universities has allowed them to spend more time supervising and training their HQP, as well as on their research program more generally. This may contribute to a growing tension, however, between the teaching and research role of university researchers, particularly in primarily undergraduate universities. Indeed, if CRCP chairholders spend more time doing research and less time in the classroom, this implies that undergraduate students are less exposed to top-calibre researchers; as noted earlier, some HQP indicated that being taught by a chairholder contributes to their decision to pursue graduate studies in this area of research. This tension may also be feeding the resentment felt by some non-CRCP faculty who, compared with CRCP chairholders, spend a greater percentage of their time teaching and less time devoted to their research program. The benefits of teaching release for CRCP chairholders raise a complex issue, and none of the current or alternative policies to address it (e.g., mandatory full teaching release, abolishing teaching release, or any intermediate position) will likely satisfy all parties involved. Note that the CRCP has recently updated its guidelines on teaching release,

which recommends but does not prescribe a certain amount of teaching load release to protect time for research.[39]

Indeed, CRCP chairholders at institutions that do not offer teaching release were often very vocal in criticizing this policy, and others believed that they should be allowed to have an even lighter teaching load than they currently have, highlighting that more time for research was necessary and relevant, as befitting the objectives and expectations attached to the CRCP. Several pointed to the variability in this practice across CRCP host universities as a problem with the program; inter-university variability and its impacts are discussed more generally in Section 5.1 (Question 9.1). However, several other CRCP chairholders considered teaching to be a valuable activity and either chose to teach or were not unhappy about their university's teaching requirements; overall, 88% of chairholders indicated that they should have at least some teaching duties, to which they would ideally allocate approximately 13% of their time (compared with the 16% allocation that chairholders currently report; see Table XVII).

Table XVII Proportion of time currently allocated to tasks by CRCP chairholders

Task	Occurrence	Average allocation
Research activities associated with your research program	99%	38%
Administrative tasks associated with your research program (e.g., proposal writing, financial management, etc.)	96%	14%
Teaching duties (including preparation, marking, and office hours)	93%	16%
Students and research staff training and supervision (lab meeting, project supervision, mentoring, reviewing theses and papers, etc.)	97%	20%
Institutional administration (committee work: advisory, theses, tenure, recruitment, etc.) and administrative positions (professor, dean, chair of department, etc.)	93%	10%
Other	15%	2%

Notes: The average allocation includes all researchers, even those who indicated no time was spent on this task.
n=960
Source: Web survey of CRCP chairholders

Interestingly, CIHR chairholders, who currently allocate about 8% of their time to teaching duties, would ideally spend more time on teaching, whereas SSHRC and NSERC chairholders, who currently allocate about 19% of their time to this task, would ideally reduce this time, with all three groups indicating that 12–13% would be an ideal allocation.

The CRCP has also affected chairholders' time spent on other non-teaching tasks. As shown in Table XVIII, this effect has varied considerably for different chairholders, with time spent on research, administrative tasks, and students and research staff (i.e., supervision and training) generally increasing since the researcher became a chairholder; time spent on teaching duties generally decreasing; and

[39] "It is an expectation of the Chairs program that institutions provide chairholders with the support they need, such as protected time for research (e.g., providing a reduced teaching load or release from administrative duties) to allow maximum time for research. While the program does not stipulate that a certain percentage of protected time be provided, many institutions provide a minimum of 50% protected time to their chairholders to ensure their research success. Note that the cost of a teaching replacement qualifies as an eligible expense." Updated June 8, 2010. See CRCP website: http://www.chairs-chaires.gc.ca/program-programme/administer-administrer-eng.aspx#teaching

about the same proportion of chairholders reporting increases or decreases in their time spent on institutional administration. This is especially interesting given that some chairholders reported (in the web survey) having been increasingly solicited to sit on various committees because of the status of their Chair; in some cases, women and members of visible minorities in particular were sought out to ensure the diversity of committee members. Many indicated that the CRCP had led them to having a more interesting, more focused, or more appropriate role in the administration or governance in their department, institution, or field. Nonetheless, CRCP chairholders would ideally see the time they spent on institutional administration drop from 10% of their time to about half that much.

Table XVIII Perceived effect of CRCP or other chair programs on time spent by chairholders on various tasks

	CRCP chairholders (n=982)		Other chairholders (n=146)	
Tasks	Less time	More time	Less time	More time
Research activities associated with your research program	20%	46%	20%	43%
Administrative tasks associated with your research program	13%	40%	12%	36%
Teaching duties (including preparation, marking, office hours)	44%	17%	34%	14%
Time spent on students and research staff	8%	47%	8%	38%
Institutional administration*	24%	26%	16%	29%

Notes: *Difference between groups is significant ($p < 0.01$).
Ratings of "less" and "far less" were combined, as were ratings of "more" and "far more." The percentages include all researchers, even those who did not provide a rating for the category.
Source: Science-Metrix surveys of CRCP chairholders and other chairholders

Several respondents indicated that these increased responsibilities and other demands on their time were not necessarily related to their CRCP Chair, but rather to their seniority or natural progression as researchers. Other respondents indicated that they came to their Chair from non-academic environments (e.g., government or industry) or were post-doctoral fellows prior to becoming a chairholder. In other cases, the proportions have not changed, but the total amount of time spent on each task has increased considerably, with several chairholders reporting working in excess of 60 hours per week. Thus, certain variations must be interpreted with care.

Overall, compared with other chairholders, it would appear that the CRCP decreased, by a greater extent, the time the CRCP chairholders spent on teaching and administrative tasks than did the other chairs or awards programs (Table XVIII, $p < 0.01$). Moreover, in terms of time allocation, CRCP chairholders spent a greater proportion of their time on research activities than did grantees (38% and 32%, respectively, $p < 0.01$) and a greater proportion of their time on administrative tasks (14%) than either grantees (10%) or other chairholders (11%) ($p < 0.001$). Meanwhile, both other chairholders (16%) and grantees (15%) allocated a greater proportion of their time to institutional administration than did CRCP chairholders ($p < 0.001$). This confirms that the CRCP, as a whole, has allowed CRCP chairholders to be relieved of a portion of their institutional administrative studies relative to leading researchers in other comparable groups in Canada, although administrative tasks specifically related to their research program are greater.

There are also many differences to consider for Chairs from different granting councils. In addition to the different time allocations spent on teaching and HQP training/supervision that have already been covered elsewhere in this report, both CIHR and SSHRC chairholders spent significantly more time on

research activities associated with their research program than did NSERC chairholders ($p < 0.001$), with SSHRC chairholders in particular reporting increases in their time allocated to these tasks ($p < 0.01$).

Web survey data confirm that teaching release, administrative releases, and the increased ability to hire HQP (particularly research assistants, post-doctoral fellows, and senior graduate students) has been valuable to improving the research time available for many chairholders, but more particularly for those in the SSH. Interestingly, clinical scientists (who hold CIHR Chairs) often highlighted a particular benefit for their situation, as the CRCP funding buys out some of their clinical time, which they can subsequently devote to research (note: many clinical scientists receive little or no dedicated salary support for their research activities and often self-fund their research time through the provision of clinical services). Overall, chairholders praised the CRCP for allowing them greater freedom for their schedule and/or time management, including more time to attend conferences, pursue collaborations, and more generally strengthen their profile and leadership in their field. However, chairholders would like to see the time they spend on research increase from 38% to about 50%.

CIHR chairholders spent the most time on administrative tasks related to their research program (e.g., proposal writing, reporting, financial management) compared with those from the other two councils ($p < 0.001$), even though more chairholders from both SSHRC and NSERC reported greater increases in the time spent on these tasks since assuming the Chair ($p < 0.001$). Indeed, for administration and other tasks related to their research, many chairholders reported increased demands on their time associated with their CRCP Chair, including those whose research group increased in size (including number of students) after assuming the Chair or who were involved in the creation or enhancement of a research centre. In fact, while 50% of CRCP chairholders who received CFI funds indicated that they had had a positive impact on the amount of time they could devote to research and HQP supervision, between 5% and 10% indicated that this impact had been negative.

With regard to administrative tasks specifically relating to their research program, many chairholders reported that their institution had greater expectations of them (including for the leveraging of additional funds), which could be challenging to balance, time-wise, with continued expectations that they maintain a top-calibre research program. Although the CRCP funding sometimes supported the salaries of HQP for the purpose of releasing the chairholder from a portion of administrative tasks and student supervision (although this is shrinking; see Section 5.1), the need for greater support—whether from the CRCP, from the university, or from other sources—was expressed by many. Tellingly, when discussing elements that could improve their research environment, HQP in all four focus groups raised the issue of the need for or the benefit of providing support to chairholders for administrative and/or grant writing support.

Finding 32: The effect of the CRCP on the time allocation of chairholders is complex and often interacts with other factors (e.g., university practices and career progression of chairholders). Overall, chairholders spent more time on research activities, but increased administrative tasks and additional responsibilities sometimes mean that chairholders may have less time for research.

4.0 Findings — Efficiency and Effectiveness

4.1 Question 8: How could the CRCP be made more efficient while maintaining or increasing its level of effectiveness?

As a whole, the administrative processes of the CRCP were seen by evaluation informants to be clear, efficient, well run, and readily followed by those concerned. About half of the VPs Research reported that the program is about as onerous to administer as other federal grant programs or other chair programs, and roughly 30% indicated that it was more onerous, although primarily because of the nomination process undertaken at the university level; post-award administration is seen as relatively low.

Many stakeholders identified improvements to the program design and guidelines that have been implemented by the CRC Secretariat and indicated that this responsiveness was appreciated and should continue. Some minor improvements were suggested by various informants for the application, review, and reporting processes of the CRCP, as described below.

Application and review processes

Most comments about the application process for the CRCP were positive, although several comments about the timing and deadlines were made by university administrators and by researchers who declined their Chair after a successful nomination. More flexible deadlines (for intake dates as well as for the allocation of new Chairs) or faster response times for external recruitments, especially Tier 1 Chairs, were the most common complaints at the university level. Some chairholders also commented on the undue length of the adjudication process. As of 2009, the CRC Secretariat has reduced its intake cycles from three to two per year, a decision that was initially met with criticism from some VPs Research; a compromise has since been offered—foreign nominations are now being accepted at any time during the year. As the majority of Chairs are now filled, it remains to be seen what effect these changes in the intake dates and policies will have, but monitoring these effects would serve to inform the CRCP of the need for possible future adjustments, to ensure that the efficiency of the program is not reduced through these and other changes.

A number of anecdotal reports of reviewer errors or procedural incidents that resulted in the rejection of applications or renewals were also collected, but many of these could not be verified. The relatively few complaints about the review process came from unsuccessful applicants and others who noted that problems could arise when one or more of the reviewers submitted a negative review but did not adequately take into consideration the particular context of the application (e.g., access to HQP because of university size or location, the interdisciplinary nature of research topic, the fundamental or applied nature of research, etc.) or when there was confusion over the alignment of the Chair with the SRP.

However, it appears that, especially for new applications, limited mechanisms exist to appeal such decisions. The CRC Secretariat has implemented a process called "Emerging Negative Decision" (END) for renewals, which gives universities the opportunity to provide supplementary information to address the concerns of peer reviewers in the case of nominations that are not recommended for support for review. This supplementary information is then reviewed by the Interdisciplinary Adjudication Committee before the final decision is made. Given the unintended negative effects of an unsuccessful application (Section 3.5), a similar END process could also help resolve issues or

procedural/reviewer misunderstandings for new applications during the process itself and reduce the need for appeals and resubmission of applications. With the program in its mature phase, fewer new CRCP applications are now being processed, so extending the END process or implementing an appeals procedure for new applicants should not be overly burdensome for the CRC Secretariat.

Not surprisingly, chairholders who received guidance or assistance from their university also indicated that this had improved the process for them. Researchers who felt rushed or unsupported by their institution were far less complimentary about this process or their experience with the program, as this often coincided with a lack of support from the university during their Chair tenure. In particular, researchers coming from abroad or even from other Canadian universities may not be aware of the various components involved (e.g., the CFI, internal university policies). Communication is further hindered when there is limited time to obtain additional information or ask questions during the application process. This relates directly with the transparency issues that have been observed within some universities, which are discussed under Question 9.1 (Section 5.1).

Reporting and performance management processes

As with other administrative processes, most evaluation informants had few, if any, comments (especially negative ones) about the reporting process for the CRCP. A handful of institutions cited dissatisfaction with the format of the financial reports submitted to the CRCP. Some chairholders raised concerns about how the various reports they filled out (including the web survey for this evaluation) were being used to assess their performance. In particular, they lamented the focus on quantitative data and expressed concerns about whether these reporting mechanisms were adequately designed to capture research outputs and impacts from across the range of disciplines covered by the CRCP. Indeed, respondents from various fields—from the humanities to the biomedical sciences, as well as those involved in basic research—indicated that the criteria by which their performance was measured was not suited to, or was not clearly expressed with regard to, the nature of their research in their discipline.

The CRC Secretariat's increased commitment to performance management was previously noted in Section 2.1. As well as being in line with recent trends in accountability at the government level, a more formal performance management strategy was deemed necessary due to the size and visibility of the program, as well as other specific issues identified in the fifth-year evaluation of the program. Various measures were implemented, including annual reporting. Moreover, in 2005–2006, an initiative spearheaded by SSHRC's Corporate Performance and Evaluation Division aimed to provide senior management of the CRCP (among other programs) with performance measurement and review services through a dedicated performance analyst position. In 2007–2008, a review of this initiative was conducted to assess the performance measurement function and gather insight on how to best implement similar functions and initiatives across all of SSHRC's program activities.[40] This study found that the analyst was involved in a number of activities that significantly strengthened programs' performance measurement capacity, such as formal reporting, projects to review/revise, annual reports, various special studies (e.g., an environmental scan of the CRCP), and direct interaction with program

[40] Bertrand, F., and Caruso, J., February 2008. *Review of a Social Sciences and Humanities Research Council Performance Measurement Initiative (CRCP and ICP Secretariat): Summary Report.* Submitted to Corporate Performance, Evaluation and Audit Division, Social Sciences and Humanities Research Council of Canada by Science-Metrix.

management. In particular, participation of the analyst in meetings with program management was perceived to have increased management's knowledge of the relationship between performance activities and management needs and program issues, as well as performance requirements, activities, and methodologies.

This review thus recommended that SSHRC continue its commitment to maintaining positions specifically related to performance measurement in order to support the development, refinement, and implementation of CRCP's performance measurement strategy. However, neither the performance analyst position nor the performance measurement activities planned at the time of this review have been referenced or discussed by program-level informants consulted in the context of this evaluation.

Nonetheless, internal documents showed that a validation study conducted by the CRC Secretariat as part of the above-described performance measurement initiative, released in 2007, thoroughly reviewed the program's annual reports (both those completed by chairholders and those completed by the universities, excluding the financial spreadsheets).[41] The annual reports were modified the subsequent year based on the report's findings and recommendations; these modified forms are still in use by the CRCP. When the modified reports are examined in light of the chairholders' comments, it appears that several revisions made to the annual report template directly addressed many of the concerns discussed above: the changes reduced the focus on quantitative data, increased the clarity of questions, improved the usability of the data, and were more responsive to variability among disciplines. It was not always clear from the comments whether these referred to the original or modified versions of the annual reports, although none of the chairholders mentioned in the web surveys that they had observed changes (for the better or the worse) in this form. Considering how well the changes made to the annual reports responded to most of the concerns of chairholders, those who commented were likely expressing a more general dissatisfaction with the way that research performance is evaluated and measured at other levels of the CRCP (e.g., for applications or renewals, and for this evaluation), or even in the context of other grant programs.

On a related issue, some chairholders indicated that by submitting their annual reports to the universities first (reports are currently reviewed by universities prior to submission to the CRCP), there was a risk that certain elements of the reports could be modified or censored by the university—particularly any criticisms of how the CRCP award is managed at the university level. These chairholders suggested that an easy means to address this would be to have an additional form that is submitted directly from the chairholder to the CRCP, so that these types of difficulties could be communicated to the CRC Secretariat without fear of censorship or potential reprisals from the university. This suggestion is discussed further under Question 9.1 (Section 5.1).

Finding 33: The administrative processes of the CRCP are well run and efficient, although continued improvements and monitoring of these changes, such as those regarding intake dates and performance management, could help further increase the program's efficiency.

The CRCP is a large and complex program: it supports approximately 1,800 Chairs at over 70 institutions across Canada. At the management level, it involves the CRC Secretariat, three federal granting agencies, and the CFI (see Section 1.2); these organizations also work together in the administration and implementation of the program (e.g., the application for CFI funding in association

[41] Canada Research Chairs, 2007. *Validation Study Report: 2005–2006 Annual Institutional and Chairholders' Reports.*

with the CRCP application). Considering the number and variety of organizations involved in the implementation and success of the program, many issues could potentially arise that involve two or more of these organizations. The following discussion examines issues that have had an effect on the chairholder's research programs, as well as coordination issues arising between the CRC Secretariat and universities or within universities. In some cases, these findings point to the need for additional data, but as a whole, they suggest opportunities to improve the effectiveness of the program through increased linkages, communication, and coordination between the CRC Secretariat, the federal granting agencies, the CFI, and universities.

Coordination of support for chairholders' research programs

While at the aggregate level the CRCP chairholders are effectively contributing to the achievement of program objectives, the findings of this evaluation suggest that a small proportion of chairholders—likely in the order of 10–15%—are not maximizing the potential of their Chair because certain elements that are necessary to the support of their research (e.g., research funding, infrastructure support) have not come together in a timely or sufficient manner. This support comes from multiple sources, including the federal granting agencies and the CFI, as well as the universities; note that chairholders and institutions may also access resources from other sources (e.g., provincial programs, private funds).

Although the frequency of these events could not be determined precisely based on the available data (largely because the data collection instruments were not designed to do so), several reports describing or alluding to such events surfaced through multiple lines of evidence and were not limited to specific chairholders, disciplines, or institutions. These lines of evidence include the review of exit surveys and interviews with chairholders who resigned their Chair; the case studies; the CRCP chairholder and VP Research web surveys; and the HQP focus groups. Of particular concern are cases when such instances contributed to the resignation and departure of chairholders. These findings point to a need for further data gathering and monitoring to help ascertain where increased efforts for the coordination of research support would be most beneficial and appropriate. These efforts could help to ensure that the vast majority of the chairholders are provided with the support they need to ensure the success of their Chair and thus help increase program effectiveness.

Research support: CRCP chairholders are occasionally unsuccessful in their grant applications to one of the three funding councils at various points during their Chair term. This might be more prevalent for chairholders applying to the CIHR Open Operating Grant Program competitions or for certain subgroups that were found to have less success in leveraging additional research funds (e.g., certain chairholders recruited from abroad or in small universities; see Section 3.2). While this appears to be a relatively rare occurrence (as chairholders are selected based on the quality of their research program and are therefore expected to obtain additional research funds on the same basis), evidence from multiple sources confirms that some chairholders have found themselves in a position where they hold a CRCP Chair but cannot adequately support the costs of their research, particularly in the early years of their Chair term.

The CRC Secretariat, the funding agencies, and/or universities could work more closely together to monitor and better understand these types of situations, and to determine appropriate ways to reduce their frequency. Evaluation informants—including program-level interviewees and university administrators—suggested potential ways to address this issue, such as grant writing support, allocating

a dedicated portion of the CRCP amount to research expenses, or expedited peer review for CRCP chairholders. Research funding from sources other than the federal granting agencies should also be taken into account. Incidentally, and without providing a guarantee that researchers will be automatically given grants, a stricter nomination and renewal process might also help ensure that the quality of the chairholder' research programs is sufficiently high to support successful applications for research grants.

Infrastructure support: Several entities play a key role in the delivery of infrastructure projects (e.g., the CFI, universities, funding partners). Some chairholders report that although CFI support was approved as part of the Chair package, delays in obtaining these funds via the university (or in accessing the space promised by the university) slowed down the advancement of their research program, in some cases for months or even years. Moreover, the CFI requirement to secure 60% of the infrastructure funding package from other sources (e.g., the institution and/or eligible funding partners) may influence the lead time for the acquisition and the deployment of infrastructure. While universities praised the option to apply for the CFI component within the CRCP applications, a few universities have also reported challenges in administering this component.

Though the data collection instruments were not designed to measure how often infrastructure support did not come together in a timely or adequate manner,[42] several such reports surfaced through multiple lines of evidence spanning various disciplines and institutions. Specific examples were more often related to delays in setting up the facilities for chairholders arriving from outside the institution, but were also reported for chairholders nominated by their university. As seen in Section 3.2, the CFI component of the CRCP is often crucial to enhancing the research capacity of chairholders, not to mention the structuring effect it has on the research environment. There is therefore a strong potential for benefits stemming from efforts by the CRC Secretariat, the CFI, and universities to further monitor such instances (with more detailed evidence), and work together to help ensure timely infrastructure support is provided to chairholders.

Finding 34: A small proportion of chairholders—likely in the order of 10–15%—are not maximizing the potential of their Chair because certain elements that are necessary to the support of their research (e.g., research funding, infrastructure support from various sources) have not come together in a timely or sufficient manner.

Implementation support and communication between the CRC Secretariat and universities

The CRC Secretariat, as the organization responsible for the administration of the CRCP, is also the key access point for universities seeking advice or guidance on the implementation of the program within their institution. While many VPs Research praised the CRC Secretariat for its ability to provide information and assistance upon request, others expressed a need for better communication, more timely provision of information to universities (for instance, with regard to changes in program guidelines and historical program data), help in tracking allocations, and, more generally, a "proactive rather than reactive" approach to helping universities implement the program. For some of these

[42] Questions in the data collection instruments pertaining to i) infrastructure support generally, or ii) the CFI component more specifically were all phrased in a way to measure the impact of this funding; information as to challenges associated with this funding thus arose spontaneously in the context of other open-ended/qualitative questions on the CRCP program. It was also beyond the scope of the evaluation to investigate such reports in more detail.

purposes, the use of information technology tools (i.e., the CRCP website, email updates) could also be further developed.

Additional issues, such as the lack of university support for chairholders that sometimes results from the variability in which the program is implemented across universities (see Section 5.1), suggest that the CRC Secretariat, while not directly responsible for the implementation of the program within universities, is well positioned to maximize the success of chairholders by encouraging universities to adopt certain standards or best practices. For example, the CRC Secretariat can provide universities with tools and guidance with regard to implementation practices; certain university-level informants called for the CRC Secretariat to be more proactive in assisting universities in implementing the program in an optimal and efficient manner. Note that chairholders seeking direct assistance from the CRC Secretariat will generally be referred back to their university, as it is the latter who are responsible for the administration of the CRCP within their institution; implications of this practice are discussed under Section 5.1.

Note that communication issues were also found to occur within universities (i.e., between the VP Research and individual departments), particularly with regard to the strategic use of the chairs and issues such as teaching release and eligible expenditures. This suggests that greater coordination within CRCP host institutions is just as important as communication between the universities and the CRC Secretariat. Indeed, many universities clearly recognize that chairholders' success is strongly influenced by their research setting and have implemented the necessary means to ensure that a supportive environment is established and maintained, including through coordination with other CRCP-supporting organizations. Whereas some chairholders have remarked that their CRCP-related experience proceeded smoothly, in part because of the effective support framework in place at their university, others clearly feel that the support offered within their institution could be improved (see Section 5.1, Question 9.1). While the CRC Secretariat does not participate in communications within host institutions, it has a large stake in the success of its chairholders and therefore has an interest in remaining aware of and providing guidance or advice on any issues that may emerge.

Linking of chairholders, institutions, and HQP

Various stakeholders suggested means by which chairholders, their institutions, and HQP could be increasingly linked to further leverage the benefits of the CRCP. For example, opportunities for CRCP chairholders to meet, showcase their successes, and discuss their experiences were proposed to increase networking between leading researchers, to enhance the visibility of the program, and to promote the sharing of experiences, stories, and advice. This could also help increase new Chairs' access to valuable expertise or even mentoring by more experienced chairholders; examples of cases in which this might be beneficial include chairholders from abroad who may not be familiar with the Canadian research structure, chairholders in smaller institutions who may not have access to as many opportunities or well-established internal support systems, and Tier 2 chairholders who are at the early stages of their career. A similar idea was proposed in an independent study: alumni groups of chairholders could be created to ensure that their advice and assistance is not lost after they are no longer supported by the program.[43]

[43] Hickling Arthurs Low, 2009. *Review of the Framework for the Tri-Council Programs*. Draft report, p. 49.

Some interviewees pointed out that chairholders represent a large collection of talented thinkers that are scattered across disparate institutions, working away without any systematic connection to each other or to decision-makers, particularly with regard to policy issues. The CRCP could therefore encourage practices that help bring these groups together on relevant issues in order to assist and inform regulators on how to tackle some of the larger issues facing our society. While not all chairholders would be willing or able to participate in the types of activities described in this section, it would be worthwhile gauging the interest of chairholders and obtaining their input into the linkage opportunities that they would find most suitable or useful.

This type of knowledge sharing and the creation of linkages could also benefit institutions, not only at the administrative level, but also in terms of strategic advantages: universities that have selected similar or complementary strategic research areas could build networks through the CRCP in these areas. Universities could also be assisted in increasing the visibility of their Chairs, both nationally and internationally, as a means to further recruit leading researchers and high-quality students.

Many HQP who cited benefits of being associated with the CRCP proposed further means to enhance these benefits, such as opportunities to increase their own visibility under the brand of the program. For example, HQP could participate in some of the above-mentioned networking opportunities with other chairholders or other CRCP-associated HQP, or be given greater recognition of their role in CRCP-supported research in communications from both the CRCP and other outlets (e.g., in chairholder profiles or media stories). This might also help demonstrate the benefits of working with chairholders and help attract high-quality students, particularly to more isolated or smaller universities. Some HQP even suggested dedicated CRCP awards or titles (e.g., CRCP Apprentice) for selected graduate students or post-doctoral fellows who are being trained and mentored by chairholders, either through an open competition or chosen by the chairholder. While not all of these means are feasible, these suggestions demonstrate an interest among HQP for closer associations with the CRCP, especially considering, as one focus group participant said, that "we might be the CRCP Chairs of tomorrow."

Finding 35: Increasing the visibility of the CRCP and opportunities for linkages between its key beneficiaries would further amplify the benefits of the program and help increase its effectiveness.

Question 8.1: Are there alternatives that would be more efficient, and would achieve the CRCP objectives?

As the relevance and continued need of the CRCP met with broad consensus (Section 2.1), limited views on alternatives to the program were provided by interviewees and survey respondents. The alternative of distributing the CRCP funds to universities directly, meaning that the CRC Secretariat would not oversee the review process, was also proposed as a possible means to increase the efficiency of the program. However, this alternative was rejected by most as, it was claimed, it would likely mean losing the ability of the CRC Secretariat (via the College of Reviewers) to ensure the strategic fit of chairholders. Indeed, the CRCP is perceived as an effective and proven mechanism through which universities can build faculty in a way that is both research focused and strategic. Others added that the brand of the CRCP provides real value to chairholders and their institutions, and this would likely be lost or diminished if the program was delivered through other channels (e.g., individual funding agencies or institutions). The fact that other countries have adopted similar models—programs that

were delivered by a government funding agency to meet similar objectives—was also seen as evidence that the program is well suited to meeting its objectives and that no convincing alternatives have been developed.

Some alternatives that were proposed did not seek to meet the CRCP objectives, but rather were suggested as ways to use the program's financial resources to address other needs or meet other objectives. For example, a small number of informants suggested that the CRCP funds could be redistributed by the councils in the form of operating or research funding. The majority of these individuals did not believe that operating or research funds could achieve CRCP objectives (such as the attraction or retention objectives), but the suggestion was given in the context of discussions about the perceived lack of operating funds for basic research in Canada, or the falling success rates for certain competitions or disciplines (especially those relative to the CIHR).

Finding 36: Alternative modes of delivery of the CRCP (i.e., other than by the CRC Secretariat) were very rarely suggested by evaluation informants. These alternatives, as well as alternative uses proposed for CRCP funds, would not serve to achieve the program's strategic and capacity-building objectives or ensure that equivalent status was conferred to chairholders.

5.0 Findings — Governance, Design, and Delivery

5.1 Question 9: What are the impacts of program design elements on CRCP effectiveness?

Summative analysis of findings related to program design

The evidence collected as part of this evaluation supports the conclusion that the effectiveness of the CRCP in enhancing the research and training capacity of Canadian universities, as described in Section 3.0, is largely related to the alignment between its objectives and its design. Indeed, as briefly discussed in Section 2.1, evaluation informants often linked the continued relevance of the CRCP's objectives to the success and impact of the program as delivered over the last 10 years.

Similar to the fifth-year evaluation of the CRCP, which concluded that the program "is on the right track" and raised issues that needed to be addressed in order to ensure the continued success of the program, this tenth-year evaluation finds that the program's design is generally sound, but that further improvements would help to build on the successes of the past 10 years by ensuring that the program remains effective in years to come. In fact, many of these improvements are suggested not as a critique of how effective the design has been in the past, but rather with a view to the long-term effectiveness of the program, seeing as 10 years have now passed since the original program design. The program has entered its "mature" stage now that most of the Chair positions have been filled; the challenge is to shift from a start-up mode to a maintenance mode without losing the program's momentum. Moreover, while the CRC Secretariat has implemented a number of successful adjustments to the program to address issues raised in previous evaluations and by program beneficiaries, the evaluation findings show that not all of these issues have been satisfactorily resolved or addressed, and that further adjustments are necessary.

The present section therefore examines key elements of the program design with a view to assessing, first, whether they remain adequate for the next phase in the program's lifecycle (e.g., are the award amounts still sufficient to achieve program objectives?), and second, whether past adjustments or outstanding issues relating to these elements should be revisited (e.g., has the Chairs toolbox adequately addressed the problems associated with the allocation process?).

These two perspectives overlap somewhat, as some evaluation informants expressed concern that outstanding issues with the program may undermine its longer-term success (e.g., will the variability in the way universities allocate the CRCP award funds reduce the attractiveness of CRCP Chair positions more generally?). As discussed in Section 4.0, the CRCP is effectively achieving its objectives at the aggregate level, but a small proportion of chairholders are not maximizing the potential of their Chair for a variety of reasons. Seeing that the brand of the CRCP is so intimately tied to the prestige and success of its individual chairholders (rather than being associated with the success of the CRCP host universities or the impact of the program as a whole; see Section 3.5) and that that the perceived value of this brand contributes to the attraction and retention of leading researchers (see Section 3.1), any issues that threaten to decrease the status currently associated with a CRCP Chair could undermine the entire program.

5.1.1 Award amount

Since the inception of the CRCP, the award amount associated with a Tier 1 Chair has been $200,000 per year, and that associated with a Tier 2 Chair has been $100,000 per year. The informed opinion of a large proportion of evaluation informants at all levels—from program-level interviewees to universities to HQP—is that these amounts, particularly those for Tier 2 Chairs, are no longer sufficient and should be increased and/or indexed (e.g., to the consumer price index) to ensure the continued success of the program. Any recommendation with regard to the award amount must take into consideration the extent to which the award amount is responsible for the achievement of the program's main objectives. In particular, to what extent has the value of the award contributed to the attraction and retention of leading researchers, as well as to universities' capacity to generate and apply new knowledge (including the support and training of HQP)? Note that the CFI component of the CRCP has increased steadily over the lifecycle of the program and so will not be considered in this discussion, although it clearly contributes to a very large extent to the achievement of program objectives.

Allocation of CRCP funds: comparisons and trends

As stated in the program guidelines, the CRCP awards are provided to the host institutions, which are responsible for administering the funds. The universities therefore have the authority to disburse the funds as they see fit within the categories of eligible expenses identified by the program.[44] This implies that there is considerable variability in the types of allocations that chairholders receive. The allocation of the CRCP award amount across various expenses is therefore a central consideration to this discussion. As shown Table XIX, 70% of the CRCP award funds are allocated to the chairholders' salary, 11% to direct research funding, 10% to student and research staff support, and 6% to administration; note that these self-reported amounts are within a few percentage points of the most recent financial data available for the program as a whole (2007–2008; see Figure 5). The vast majority of chairholders see part of the award amount going to their salary, whereas almost 50% of chairholders receive funds that can be used for direct research support ("Occurrence" column), and 36% are allocated funds to support their students and research staff.

Compared with other chair program awards, a greater proportion of CRCP funds go to salary and administration, whereas other chairholders receive more funds that can be used directly for research, as well as for student and research staff support ($p < 0.001$). Comparisons between the CRCP chairholders and grantees (Table XIX) must be interpreted with care, as grantees reported the allocation of their research grants, which, not surprisingly, are split almost equally between direct research funding and student and research staff support. However, this is helpful in interpreting the responses of these two groups to questions regarding the impact of their funding, as discussed in Section 3.2. Within the CRCP, the occurrences and proportions shown in Table XXI vary across funding agencies, tiers, and university sizes. Indeed, funds are allocated to support research for 66% of SSHRC Chairs, compared with 52% of NSERC Chairs and 41% of CIHR Chairs (although the proportion allocated directly to research support by CIHR Chairs who *do* use CRCP funds for this purpose is greater than for SSHRC Chairs, resulting in similar average allocations by council). In addition, significantly more CRCP funds are allocated to student and research staff support for SSHRC Chairs than for NSERC Chairs ($p < 0.05$).

[44] See the CRCP website: http://www.chairs-chaires.gc.ca/program-programme/administer-administrer-eng.aspx#eligible

Table XIX Allocation of funds as reported by CRCP chairholders (CRCP award), other chairholders (other award) and grantees (federal research grant)

	CRCP chairholders		Other chairholders		Grantees	
Category	Occurrence	Average allocation	Occurrence	Average allocation	Occurrence	Average allocation
Direct research funding*	48%	11%	68%	34%	93%	46%
Your salary/benefits*	88%	67%	73%	44%	2%	1%
Students and research staff support*	36%	9%	37%	17%	88%	51%
Faculty salary (other than yourself)*	5%	1%	2%	1%	0%	0%
Administration*	41%	6%	11%	1%	8%	1%
Other	9%	3%	5%	2%	8%	1%

Notes: *Difference between groups is significant ($p < 0.01$).
The average allocation includes all researchers, even those who indicated zero for a category.
Source: Web survey of CRCP chairholders, other chairholders, and grantees

A clear picture has emerged between tiers in the survey data, as a significantly greater percentage of the award is allocated to salary in the case of Tier 2 Chairs (73%) than in the case of Tier 1 Chairs (66%), which means that Tier 1 Chairs receive a greater proportion of funds from their institution that can be allocated to direct research support, student and research staff support, and administration ($p < 0.01$ for all comparisons). This finding is backed up by numerous informants, who state that the entire CRCP award is often taken up by the Tier 2 chairholder's salary, particularly as the chairholder gains in seniority, leaving little funds for other purposes. Similarly, looking at university size, large universities allocated a greater proportion of the CRCP funds to salary (74%) than medium (65%) and small (58%) universities, allowing for chairholders from the two latter university types to allocate a larger share to direct research support and student and research staff support ($p < 0.001$). It should be noted that small universities generally have more Tier 2 Chairs than Tier 1 Chairs, whereas medium and large universities have a roughly equivalent mix, so it is likely that the effects of university size and tier are related.

Note that the allocations of CRCP funds have changed over time, with the proportion that supports the chairholder's salary increasing from 53% to 74% between 2002–2003 and 2007–2008 (the last year for which complete data are available), leaving a shrinking portion for other purposes (Figure 5). As explained above, there is considerable variability in this portrait between universities based on their allocation of CRCP funds (i.e., this is not dictated by the CRCP), but the overall trend over time is telling. This relates to the fact that the CRCP award amount has not increased since the launch of the program but salaries obviously have, with universities continuing to rely on the CRCP award to support, in part or in whole, chairholders' salaries.

Looking at the allocation trends for Tier 1 and Tier 2, the share that is allocated by the universities to the chairholders' salaries is even greater for Tier 2: 78% in 2007–2008, compared with 59% in 2002–2003. The share allocated to Tier 1 chairholder salaries increased from 55% to 71% during the same period. In both cases, the biggest reductions are observed for allocations of salaries to non-students (26% to 11% for Tier 1 Chairs, 23% to 6% for Tier 2 Chairs). That universities allocate a greater share of the CRCP to Tier 2 chairholder salaries is not surprising, since, based on data from the 2006 Census,

the average salary of a full professor in Canada was $119,126, or $95,682 for an associate professor. In other words, a Tier 2 chairholder's salary would clearly take up most or all of the $100,000 Tier 2 award as the chairholder progresses through the stages of the tenure-track system over the course of his or her CRCP term(s).[45]

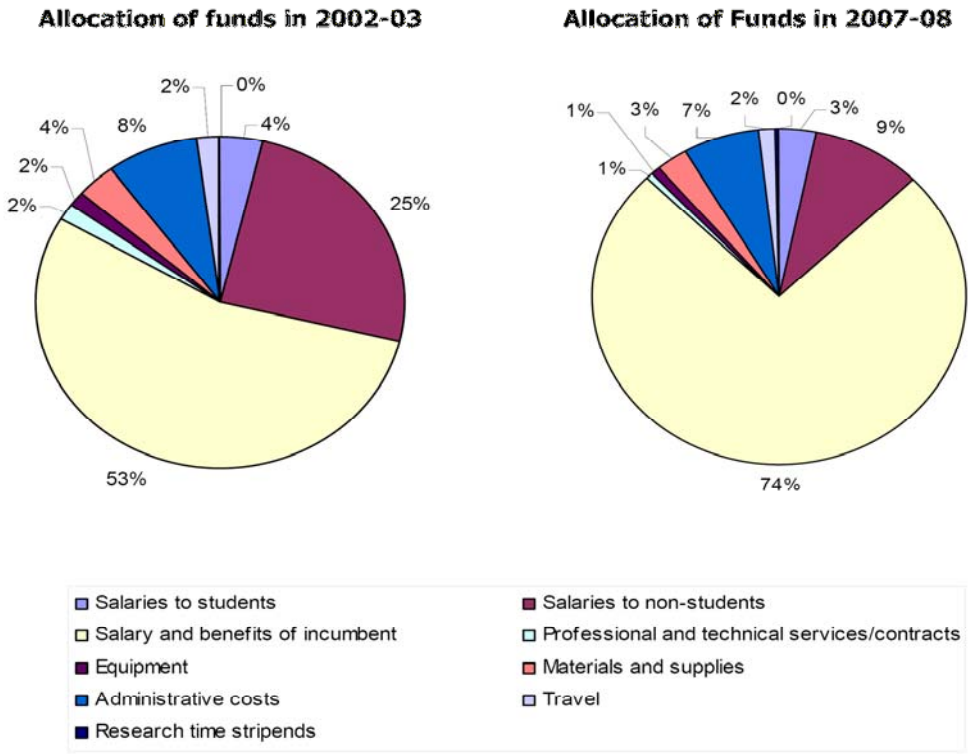

Figure 5 Allocation of CRCP funds, 2002–2003 and 2007–2008

Source: Canada Research Chairs, *Year in Review 2007–2008* (confirmed by Science-Metrix using CIMS data)

Furthermore, based on the consumer price index (CPI),[46] the purchasing power of the Tier 2 award dropped from $100,000 in 2000 to about $82,000 in July 2010, which affects the ability of the chairholder to support research costs. The CPI actually underestimates the salary increases that have occurred in academia, with a full professor earning an average of $96,471 in 2000 (based on 2001 Census data) and an associate professor earning an average of $77,617, indicating that salaries increased in the first five years by as much as the increase of the CPI over the last 10 years. It is understood that faculty salaries have also increased at the international level.

Finding 37: The CRCP award amounts have not changed since 2000 and have not kept up with inflation and salary increases. All sources of evidence confirm that CRCP awards—especially for Tier 2 Chairs—are being increasingly allocated to chairholders' salaries (now 74% of the award).

[45] 2009–2010 data are available for the average salaries in 30 Canadian universities, indicating that only at small universities were the average annual salaries for associate professors below $100,000. See: Statistics Canada, 2010. *Salaries and Salary Scales of Full-time Teaching Staff at Canadian Universities, 2009/2010: Preliminary Report*. Catalogue no. 81-595-M No. 086.

[46] Statistics Canada, 2010. *The Consumer Price Index (July 2010)*. Catalogue no. 62-001-X.

Impact of fixed award amounts on achievement of program objectives

The review above outlines the basic facts cited by multiple evaluation informants to justify their suggestion of an increase in the value of CRCP awards and/or their indexing (e.g., to the CPI or via another suitable mechanism) to account for inflation. The evaluation informants include program and university-level informants, whose primary argument is that the award amounts are no longer competitive with other chair programs in Canada or with offers made to researchers in several other countries, which affects the recruitment and retention power of the Chairs. Indeed, as seen in Section 3.1, many of the factors that contributed to chairholders' decisions to accept the Chair involved the availability of funding (for research and support of students and staff), the prestige of the award, and—particularly for those coming from outside Canada—the salary offered. The prestige is also seen to be contingent on the amount of the award, as pointed out also by several interviewees and survey respondents, as well as an independent study conducted on the Tri-Council's framework of programs in 2009, which suggests "reassessing the value of the awards."[47] University-level interviewees also point out that, since the award amount is no longer sufficient to cover the salary of many of the researchers they are attempting to retain and recruit, they must divert additional resources for this purpose, which further dilutes the effectiveness of the program with regard to the overall research capacity of their institution.

Meanwhile, evaluation informants at the chairholder-level (including researchers who resigned a Chair, other chairholders, and HQP in all four discussion groups) focused mainly on concerns that the share that can be used to support elements of their research program beyond their salary, most particularly students and research staff, is shrinking or was not even made available to chairholders. In fact, there are already a few reports of chairholders who resigned their Chair in large part because their CRCP funds did not provide sufficient resources to support research (particularly for students and research staff), and they were offered an opportunity at a different university or in a different country that was more competitive in this regard.

Discussions and comments about the award amount also centred on the increasing perception among stakeholders that a shift is taking place in the CRCP's main purpose toward the support of chairholders' salaries rather than the support of their research. Indeed, the extent to which the CRCP directly supports research is probably one of the most complex and misunderstood elements of the program. On one hand, only 11% of the award amount has been used to directly support research (20% if one adds support for students and research staff)—compared with almost 100% of the research grants that are used for this purpose—and this amount is currently shrinking (Figure 5).

Some chairholders, in the web survey, even commented that they were not aware that that CRCP funds could be used for purposes other than their salary. Thus, the capacity of the award to directly contribute to the production and application of new knowledge is actually quite limited (and as discussed in Section 3.2, occurs mainly through indirect ways). Moreover, the ability of the CRCP to continue to alleviate barriers to recruitment and attraction relating to the availability of research funding as discussed in Section 3.1 is also decreasing, as the CRCP is already becoming increasingly perceived as a title with little additional value for the research program of chairholders.

[47] Hickling Arthurs Low, 2009. *Review of the Framework for the Tri-Council Programs*. Draft report, p. 46.

On the other hand, as seen in Section 3.2, a majority of CRCP chairholders report that CRCP funding has effects on the quality and impact of their research, and those who are able to use a portion of their CRCP funds for research support highly praised the benefit of having a stable source of funds (albeit a small one) that allowed them to plan more original and/or longer-term research projects. And of course, CRCP chairholders are, as a whole, successful in their ability to leverage additional research funds from a variety of sources. Indeed, chairholders are expected to be successful in leveraging these funds, seeing as they have been selected on the basis that they are promising or leading researchers in their field. This reasoning poses a problem, however, in a context where research funds are limited and competition for available funding is increasing (perhaps, as some informants suggested, as a result of the influx of leading researchers as caused by the CRCP), meaning that even chairholders may be facing decreasing success rates. Given the significantly higher impact of federal research grants, as reported by grantees, on research quality and impact, some would argue that the CRCP funds would best be allocated to open competition research grant programs in order to increase the amount of support for basic and/or applied research.

This last argument might stand if the production and application of new knowledge was the only objective of the CRCP, but, as discussed in Section 4.1, this type of alternative has been rejected on the basis that the strategic aspect of the CRCP would then be lost. Moreover, there are three other main objectives of the program, all of which remain relevant and hinge on the ability to attract and retain excellent researchers (Section 2.1). Based on the risks for the effectiveness of the program associated with retaining the award amount at the current level, multiple lines of evidence suggest that increasing these amounts would be justified.

Note that a certain number of informants, including program-level informants and chairholders, suggested that it might be appropriate to reduce the number of Chairs in order to increase the amount, although this was not a particularly popular suggestion for others, who explain that this would reduce the effectiveness of the program. In particular, university representatives have pointed out that their ability to recruit and retain leading researchers in strategic areas is already limited by the small number of currently available Chairs; this would be even more limited during the period over which the number of Chairs is cut back.

Finding 38: The fixed award amount is limiting the ability of the CRCP to achieve its objectives of a) attracting and retaining excellent researchers, and b) enhancing the capacity of universities to produce and apply new knowledge.

5.1.2 Tier system/award duration

As in the third-year evaluation, the two-tier system of the CRCP continues to be seen by evaluation informants as a positive element of the program design as a means to support the attraction and retention of both established and promising researchers, thus ensuring long-term capacity building. No evaluation informants raised any significant objection to offering Chairs at two levels. The fact that Tier 2 chairholders may not perform at the same level of Tier 1 chairholders is expected, seeing the differences in career status, but the fact that the performance of Tier 2 chairholders as a whole (e.g., in the bibliometric analysis and for certain indicators) is often similar to that of other chairholders (which include both junior and senior researchers) and grantees (which include researchers who have received

large grant amounts) also suggests the value of the CRCP in helping to establish the career of the next generation of high-calibre researchers.

Finding 39: The two-tier system is effective and appropriate to ensure long-term capacity building. The fact that Tier 1 chairholders often perform better than Tier 2 chairholders is expected based on their career status, but it is worth highlighting that Tier 2 chairholders often perform better or as well as leading researchers in groups that include both junior and senior researchers.

However, a large proportion of evaluation informants at the program, university, and chairholder levels expressed serious concerns about the long-term effect of the tier system. In particular, there are potential issues stemming from the different duration of terms (Tier 1 Chairs are offered for seven years and Tier 2 Chairs for five) and the renewal policies for each of the tiers (Tier 1 Chairs renewable indefinitely, Tier 2 Chairs renewable once). Among other design elements of the CRCP, VPs Research gave the lowest (most negative) rating for the impact of the different renewal policy of the two tiers on the success of the program within their institutions. These concerns have also been recently heightened with the impending approach of the end of the second term of the first cohorts of Tier 2 Chairs.

Indeed, the fact that the Tier 2 Chairs can be held for a shorter maximum duration (i.e., two terms of five years, for a total of 10 years) than Tier 1 Chairs (i.e., consecutive seven-year terms) and the fact that there are currently more Tier 2 chairholders (58%; see Table II) than Tier 1 chairholders (42%) point to a potential bottleneck blocking the opportunity for progression of eligible chairholders from Tier 2 to Tier 1. While some Tier 2 chairholders clearly understand that a Tier 1 position is not guaranteed at the end of their current Chair tenure (some even indicating that they are prepared to leave their institution or the country if they are not offered a Tier 1 position), others expect to receive a Tier 1 position (or equivalent advantages and conditions) and will likely be dissatisfied if this does not occur. As discussed in Section 3.5, one of the unintended effects of the program is a potential dampening of the reputation and status of chairholders who lose their Chair, which could also apply to those who must give up their Chair title after the second term of their Tier 2 award.

In light of the different term characteristics, one or more of the following factors may contribute to the creation of a problematic gap for researchers nearing the end of their Tier 2 position:

- Some Tier 2 chairholders at the end of their second term will not yet have achieved the calibre of a senior researcher, so their university and/or the CRCP are not ready to support their advancement to a Tier 1 (or equivalent) position.
- Some universities have internal policies to use the Chairs for external recruitment only, meaning that Tier 2 chairholders may not be considered for a Tier 1 Chair within their current institution.
- At some institutions (especially universities with smaller allocations of Chairs), all Tier 1 Chair positions are currently filled and few are expected to become available for eligible Tier 2 chairholders ending their second term due to the bottleneck effect explained above.

The implication of this gap is that Tier 2 chairholders are more likely to look elsewhere (e.g., another institution in or outside of Canada) for a more advantageous position to take on after the end of their Chair tenure. Indeed, these chairholders are aware they may lose a number of advantages at the end of their term (e.g., salary, teaching or administrative release, support for students/staff), as well as the prestige of the Chair title. Approximately 200 Tier 2 chairholders will finish their second term before

December 2012. Knowing that about 50% of CRCP chairholders expressed a high likelihood of pursuing their research program outside of Canada had they not received a Chair (more so than for other chair programs), there is the potential for the departure of a significant number of chairholders for institutions outside Canada, as well as a shuffling of researchers back and forth between host institutions. Certain chairholders may also choose to terminate their Chair ahead of schedule in anticipation of the gap (as seen in some of the interviews with chairholders who resigned their position), and some informants expressed concern that the attraction of the Tier 2 Chairs will be diminished if the perception increases that these chairs represent a relatively short-term (i.e., 10-year) opportunity.

This situation could also potentially put an added strain on universities that have come to depend on the CRCP to support chairholders' salaries after the end of their second Tier 2 term. If the researchers stay at their institution, the university must find funds to support them, and a few universities indicated that they are currently unsure as to how they would find the means to do so. It should be noted that universities are responsible for planning their long-term staffing in the context of the CRCP; the evidence shows that some are already developing ways to address this issue, while others are less well prepared. This situation may be a more significant problem for smaller institutions, which have fewer Tier 1 Chairs to offer and more limited resources to offer similar conditions to the CRCP (e.g., a university research chair) to Tier 2 chairholders nearing the end of the Chair tenure. These institutions may therefore end up constantly rebuilding their expertise as their Tier 2 chairholders depart for larger institutions.

Some solutions to this issue have already been implemented, including the corridor of flexibility. This allows some universities to convert to a Tier 1 Chair if they have two Tier 2 Chairs available, or if a Chair is allocated to a different council (e.g., the CIHR), to create a position in the chairholder's discipline area (e.g., NSERC). While the corridor of flexibility has been praised by universities for solving some issues, it is relatively narrow, and few universities will have sufficient Chairs available to be able to use them as "flexible Chairs" to retain Tier 2 chairholders.

Some universities are considering internal options to alleviate this issue, and possible options at the level of the CRCP have also been suggested, such as:

- shortening the duration of Tier 1 Chair terms to five years or offering only one renewal (but potentially decreasing their attractiveness for senior researchers, particularly those from abroad, as well as the benefits of longer-term planning of research);
- adding more Tier 1 Chairs to the program so as to free up positions for eligible Tier 2 chairholders (but requiring additional resources for the CRCP and potentially diluting the prestige of the Chairs);
- increasing the duration of Tier 2 Chairs to seven years (but further limiting the turnover of Chairs and the number of Tier 2 Chairs that become available each year);
- allowing universities to nominate Tier 2 Chairs for a third term (but again limiting the number of Tier 2 Chairs that are freed to attract other researchers); and

- increasing the number of "flex moves" in the corridor of flexibility for Tier 2 to Tier 1 advancement in the case of universities that have available Chairs to do so (but this will likely help larger universities more than smaller ones).

While none of these solutions are perfect, this is clearly an issue that presents substantial liability for the program and should be addressed.

Finding 40: Although the two-tier system is a useful design element of the CRCP, the misaligned duration and renewal policies of the two tiers is creating a gap between the two tiers that threatens to result in the departure or dissatisfaction of chairholders at the end of their second terms, as well as lessening the attraction of candidates to Tier 2 Chairs more generally.

5.1.3 Chairs allocation and reallocation process

Evaluation informants raised several issues with the allocation process and, more specifically, the reallocation process, for Chairs (note that the Chair allocation formula based on discipline will be examined in detail under Section 5.2). The need to apply some mechanism through which to allocate Chairs is recognized by informants at the program and university levels, who also recognize that no system will please all stakeholders. As for the reallocation process, however, the informed opinions of VPs Research are split, largely predicated on whether their institution has gained Chairs (in which case they are generally positive) or lost them (in which case they are often strongly negative).

Universities that have lost Chairs often indicate that the bi-annual reallocation process was "disruptive," was "unmanageable," "makes strategic planning highly challenging" (because Chairs can be reallocated every two years), and "discredits" or "undermines the retention objectives of the program." In the web survey, when asked about the impact of various elements of the design of the CRCP on the success of the program within their university, VPs Research rated the allocation/reallocation process the second-to-last (where the last had the most negative impact). They also called for greater flexibility in the process and suggested changing the calculation of allocation to every three years to better enable universities to plan more effectively for the deployment of their Chairs.

It should be noted here that the CRCP has anticipated some of these issues and implemented elements within its "Chairs toolbox," partly in response to previous evaluations, which can help alleviate some of the disruptions caused by the reallocation process.

- The corridor of flexibility can be used by universities to split Tier 1 Chairs into two Tier 2 Chairs (and vice versa) and reassign Chairs among the three granting agencies; the number of "flexible Chairs" depends on the number of Chairs allocated to a particular university.
- A phase-out funding mechanism using a sliding scale of decreasing support (100–50–0%) is provided to universities that lose chairs through the reallocation process. As specified in the program guidelines, the "duration of the phase out period itself, as well as the length of time that funding will be applied at 100 per cent and 50 per cent may vary, depending on the Chairs program budget at the time. The level of funding provided for Chairs lost in the 2008 re-allocation is 100 per cent for six months, then 50 per cent for the next six months."
- Chairholders can retain their titles until the end of their existing terms.

It is not always clear if the comments about the disruption caused by losing Chairs through the reallocation process refer to the period before or after the implementation of these tools; adjustments to all three of these "tools" were made as recently as 2009. University administrators have reported that both of these elements of the "toolbox" have been "very helpful," particularly the corridor of flexibility and the fact that chairholders can retain their titles; these elements should therefore be retained by the CRCP. Some universities have called for a greater number of "flexible Chairs" or a longer phase-out period (i.e., 100% for one year, then 50% for a second year). Moreover, as the fluctuations are likely to affect smaller universities disproportionately, additional flexibility for these institutions (e.g., on a case-by-case basis) may be warranted. Overall, the CRCP should continue to monitor the impact of its reallocation process and make further adjustments accordingly. In particular, recalculating the allocations every three to five years could help minimize the observed disruptions (such as the loss of a Chair after only two years), as well as reduce the costs of this process. Guaranteeing that Chairs are allowed to at least terminate their terms would be a way to minimize disruption at the level of individual researchers. Ideally, chairholders who are performing in a satisfactory manner would not be penalized at all for the performance of their host organization, as they have nearly no ability to influence this. Hence, a mechanism could be sought to safeguard committed Chairs from these outside disruptions.

Finding 41: The reallocation of Chairs every two years can be disruptive to universities that lose Chairs and makes longer-term planning more challenging. Recent adjustments to the "Chairs toolbox" has already helped to alleviate some of these problems; further monitoring and subsequent adjustments (as indicated from the monitoring) by the CRCP would be warranted on this issue.

5.1.4 Renewal process

Most comments regarding the renewal process related specifically to the implications of the difference in renewal policies between the Tier 1 and Tier 2 Chairs. Many VPs Research were positive about the renewal process more generally, indicating that their needs have been well met in this regard by the program's design, although a few have indicated that this process could be accelerated to facilitate budgeting. The "Emerging Negative Decisions" process for renewals and the fact that Chairs can retain their title if there is a break in funding during the renewal process are examples of the ways in which the CRCP has responded to the needs of universities and chairholders.

A few other interviewees at the program and chairholder levels have suggested that the bar should be raised for renewals, to ensure that the quality of the research remains at a high level and that under-performing researchers are not kept within the program, both of which may contribute to the perception that CRCP Chairs are not always held by leading researchers in their field (Table XVI; see also discussion under Section 3.5). While this was not a widely expressed view, it may indicate a need for clearer performance standards that should be met for Chair renewals at both levels (i.e., Tier 1 and Tier 2), as a means to ensure consistency in the quality of Chairs nominated by different universities, as well as to provide the chairholders themselves with a clear idea of what type of performance is expected of them. The potential influence of internal politics on the renewal of candidates is similar to what might occur in the case of the nomination of candidates by host universities, which is discussed under Question 9.1.

5.1.5 Recruitment process

VPs Research indicated that the recruitment process was the element of the CRCP design that had the most positive impact on the success of the program at their university, as it allowed them to select the candidate that best suits their needs. However, it is one of the more onerous elements for them to administer. Both VPs Research and program-level interviewees considered the recruitment of candidates in line with the SRP and in combination with the CFI application (as part of the same process) to be beneficial for universities. Some universities also indicated that they are reviewing (or planning to review) their SRP in light of changing priorities and emerging research areas over the last 10 years, as well as to respond to the need of their community to be involved and garner support for the internal allocation of Chairs to certain research areas.

Some VPs Research said that the intake cycles are too infrequent and that the turnaround on decisions may cause them to lose a candidate. Other were critical of the variability in which the Chairs were supported or selected between universities, citing issues with transparency, variable interpretations of application criteria across universities (e.g., as pertains to the expectations associated with the two tiers and three granting agencies), and the interference of internal politics in the process. These issues are discussed under Question 9.1.

5.1.6 University funds administration

As stated in the program guidelines, the CRCP awards are administered by the universities. The universities therefore have the authority to disperse the funds as they see fit within the categories of eligible expenses identified by the program.[48] This implies that there is considerable variability in the types of allocations chairholders receive (as seen under Section 5.1.1), which has a range of impacts on the program's effectiveness across universities (see Question 9.1). Universities are very satisfied with this element of the program's design, and the only negative comments related to the forms used to report expenses to the program, which some universities found to be unclear or not well aligned with the way they tracked their finances.

There have also been reports of universities not respecting their financial agreements with chairholders; examples were cited by program-level interviewees, former chairholders who had resigned their Chair, and current chairholders. In the web survey, 74% of chairholders reported that the allocation of these expenditures were in line with their initial agreement with the university, 10% disagreed, and 16% did not know or did not answer the question; several provided comments saying that they were unhappy that the university did not provide them with any information about how the CRCP funds were allocated, either during the nomination/recruitment process or once they held the Chair. Thus, issues with financial management of the funds do occur, though they are likely limited to about one-quarter of chairholders. This finding suggests that there is room for universities to be more transparent about CRCP-related expenditures with chairholders.

A greater proportion of chairholders from large universities did not know or did not answer this question (19%), whereas a greater proportion for medium universities (13%) indicated that expenditures had not been in line with their initial agreements ($p < 0.05$). More Tier 1 chairholders were in a position to answer whether or not the allocation agreement had been respected compared with Tier

[48] See the CRCP website: http://www.chairs-chaires.gc.ca/program-programme/administer-administrer-eng.aspx#eligible

2 chairholders ($p < 0.05$), perhaps because experience has taught them to be more cautious or in a better position to negotiate their financial agreement with the CRCP host university.

Chairholders who reported that the allocations they received were not in line with the initial agreement cited a wide range of issues, such as various university policies by which funds were retained for other purposes (e.g., administrative overhead, graduate student support, not all of which were of direct benefit to the chairholder) or a decrease/absence in the funds they could apply to research or student and staff support. Note that changes in the allocation of funds from the initial agreement were often seen to occur at the time of the Chair's renewal, when chairholders were told that a larger proportion of the Chair award would be required to support their salary, or when chairholders successfully negotiated for a greater amount of funding for research and HQP support. As with certain impacts of CRCP renewal and recruitment, the impact of the administration of CRCP funds by universities concerns implementation at this level, and is best discussed under the Question 9.1, below.

Question 9.1: To what extent have university practices implementing the CRCP impacted the program's effectiveness (e.g., hiring practices, nominating procedures, renewal decisions, university support, use of funds)?

A key element of the CRCP's design is that the program provides the means for universities to recruit chairholders and administer the CRCP awards as best suits their needs. These decisions can be made at various levels within the university (i.e., VP Research office, faculty, or department). Thus, chairholders at different institutions, and even within the same institution, do not receive the same type of support. Most VPs Research (69%, with 24% indicating they do not know or choosing not answer this survey question) recognize the variability in the implementation of the program, and about 20% perceive that this variability may have a negative impact on the effectiveness of the program—usually because larger institutions have more resources to offer the Chair and may lure their chairholders away from smaller universities with more advantageous packages. However, as a whole, university administrators see this element as a strength of the program and confirm that it allows them the flexibility to derive the types of advantages they most need from the program; in fact, some universities feel that additional flexibility would be beneficial to them.

As discussed in Section 4.1, the success of a Chair is determined not only by the nomination of a leading researcher, but also by the support the selected chairholder receives at various levels; this includes support for infrastructure, for research, from the CRCP, as well as from within their own university. Thus, this design element means that universities, in managing its contingent of Chairs, including award allocations and other benefits associated with the CRCP, have a significant influence on the success of their chairholders.

There are certainly many chairholders who are satisfied with the support they have received from their university, but recurring issues described in the interviews and web surveys indicate that a certain proportion of chairholders are not satisfied with their level of support; this was particularly the case for some chairholders who had resigned their Chair. Moreover, even when chairholders are satisfied with the type of support they have received, they (and their HQP) generally view the variability in the way the program is implemented across universities as a negative aspect of the program, with many respondents calling for stricter and more consistent guidelines on how the program is implemented at

the university level; this implies a need for less control by university administrators and more accountability for universities whose practices do not respect the guidelines of the program.

Certain evaluation informants at other levels (e.g., program level, university administrators, HQP) and internal documents also confirmed that certain implementation practices could be problematic from the point of view of chairholders. The implementation practices that were most often criticized include the universities' recruitment/renewal processes, and varying practices regarding teaching release, administrative costs retained by the university, and support offered by the universities (e.g., for research, infrastructure, administration, and HQP). Many of these issues are recurring: they have been noted in previous studies and articles on the program, with both the third-year and fifth-year evaluations making recommendations in this regard.

Many chairholders feel that these elements detract from the credibility and integrity of the program and, as such, diminish the attractiveness of the CRCP Chair positions. This relates in part to their expectation that, as the stars and faces of the CRCP (see Section 3.5), they should receive the support they need to maximize the success of their research program, yet chairholders have relatively little control over how the university chooses to administer their Chair, and have no contract with the CRCP that could be leveraged to redress any of the elements that they find unsatisfactory.

As many of these issues have been longstanding, it is not always possible to determine the extent to which university practices have improved over the lifecycle of the program. Certainly, these issues were not seen in all cases: many chairholders are satisfied with the way the program is run at the university level, and others have reported improvements in the way their university manages its contingent of Chairs over the last 10 years. However, seeing the quantity of interviewees, survey respondents, and focus group participants who raised similar types of issues, there remains room for improvement in a number of cases. The key elements are discussed below: first, those pertaining to recruitment, nomination, and renewal processes; and second, those pertaining to the variability in the type and extent of support offered by universities to their chairholders.

5.1.7 Nomination, recruitment and renewal processes

The decision to nominate or renew a chairholder is made by universities based on their staffing needs and guided by their SRP. Available information about the recruitment and nomination process indicates some variability across institutions, with some universities undertaking a full and open search for a candidate similar to a regular academic hire, whereas others offer Chair positions to candidates (internal or external) that have been identified by committees, faculties, or other instances within the university.

In the latter case, greater potential for lack of transparency is possible, and this has been a recurrent complaint of chairholders (this issue was also noted in the third-year evaluation of the CRCP). Indeed, in the interviews and web surveys, lack of transparency was linked to higher levels of resentment from non-CRCP faculty, greater concerns about inequities (see Section 6.1), and more prevalent perceptions that chairholders have been nominated for political reasons (e.g., based on the preferences of senior administration) rather than based on their scientific and strategic merit. In contrast, institutions with a more open process find that this helps ensure buy-in and support for the chairholder and helps the chairholder understand the steps and expectations associated with a CRCP Chair. Roughly 60% of VPs Research perceive that their hiring, nomination, and/or renewal process has had a positive impact on

the program's success, with most of the remainder indicating that these had no impact; unfortunately, it was not possible to link these responses to particular practices.

The implementation of the program at the university level also means that the main point of entry and contact with the CRCP is at the university level. With regard to the nomination and recruitment process, this can imply potential chairholders are not always made aware of the possibilities offered by the program before they receive their Chair, as discussed with regard to the financial management of the award in Section 5.1.6 and with regard to the variability in the support offered by universities in Section 5.1.8. Depending on the level of transparency and communication between the university and the potential chairholder about the CRCP during the nomination and recruitment process—which may depend on the time available to do so—the expectations and needs of the two sides will be more or less clearly outlined and documented. Again, clearer expectations were found to contribute to the success and satisfaction of chairholders. Greater clarity and guidance during the nomination process may be particularly important for incoming candidates—especially those from other institutions and foreign Chairs—to ensure these chairholders are better prepared for the particular demands and challenges that come with the Chair.

Many examples were seen of ways in which universities have implemented successful practices to improve communication and the effectiveness of the nomination and renewal processes. Chairholders have praised the support offered by the university (e.g., research office, departmental administrators, support staff, etc.), including in reviewing and providing feedback on the application, supporting the infrastructure element, providing easy access to information, and offering flexibility in the types of support. Certain universities—most often large institutions—even have staff positions dedicated to the provision of support for various chair programs, including the CRCP. While certain universities find that the recruitment and nomination process of the CRCP to be the most onerous to administer, there are clear longer-term benefits to implementing best practices in this regard.

Finding 42: Universities have developed a range of practices to select and support the nominations for Chairs and renewals, but in some cases the lack of transparency in these processes creates resentment and feeds the perception that the institution's decisions are driven by internal politics rather than justified by scientific/strategic criteria. Clear, transparent, and well-supported nomination/renewal practices are beneficial for both the success of chairholders and to minimize unintended impacts among non-CRCP faculty.

5.1.8 Variability in support provided by universities

Several types of support, both financial and in-kind (including teaching release), may be offered by universities, and there is also considerable variability in the way different universities allocate the CRCP funds, including across faculties, departments, and individual Chairs (see also Sections 5.1.1 and 5.1.6). As mentioned above, many chairholders are satisfied with the support they have received, while others find that it does not meet their expectations or their understanding—hence the importance of clear communication during the nomination process.

Additional financial and in-kind support

Overall, 66% of CRCP chairholders received additional financial support from their university, with no trends observed across funding agencies, tiers, university size, or previous affiliations of the chairholder

(i.e., within nominating university or from other types of institutions). The most frequently reported type of additional support were start-up funds, but common responses also included top-up salary support; funds for research, administrative, or technical support; funds to support students; infrastructure support; and travel costs.

This proportion is significantly more than that reported by other chairholders—of whom 40% report having been provided with additional support with their chair or award—and more than grantees, of which 47% negotiated additional funding when they accepted their current position (both $p < 0.001$). This indicates that a greater proportion of chairholders receive additional financial support than other leading researchers, although this may exacerbate feelings of resentment among these other researchers, as well as chairholders who receive less than their counterparts in other institutions or departments (see Section 3.5). However, given the importance of funding for research (Section 3.2), this may be taken as an indirect but positive impact of the CRCP on the success of chairholders and effectiveness of the program.

In-kind support includes space and facilities, access to administrative support staff (including for CRCP/CFI applications and grant writing; see Section 5.1.7), teaching release (see Section 3.4), and the salaries of administrative, technical, and research staff shared with other researchers or associated with an individual Chair. Examples of in-kind support that had directly contributed to the success of chairholders were cited by evaluation informants at all levels, but most especially HQP, whose experience of the research environment was directly impacted by many elements at this level. The variability of teaching release is perhaps the most contentious issue with regard to in-kind support, as approximately one-third of universities do not offer this option, to the dissatisfaction of their chairholders (see Section 3.4).

Finding 43: Most universities offer additional support to their CRCP chairholders, either in the form of additional funds (for 66% of chairholders, which is significantly higher than for comparable groups of researchers), as well as various types of in-kind support, which contributes to the success of CRCP chairholders.

Variable allocation of the CRCP award

As reviewed in Sections 5.1.1 and 5.1.6, universities display a great range in the way they allocate the CRCP funds, with an increasing share being allocated to the chairholder's salary. Chairholders are not always aware of the precise allocations of the CRCP award applied by their institution (this lack of transparency being a point of contention for many). Those who could comment were generally more satisfied if they received CRCP funds to support their research activities directly (almost 50% of chairholders; see Table XIX) or via student and research staff support (36% of chairholders), as this allowed them additional flexibility and a longer-term window through which to advance their research program (see Section 3.2 on the impact of CRCP funding).

Variability in the amount retained by the university for administrative costs was also a frequently mentioned issue by chairholders. Overall, 41% of chairholders reported CRCP funds being used for administration (Table XIX), although program data suggest this proportion is closer to 60%, suggesting a lack of transparency on this point. The administrative component troubled several chairholders, especially those who did not perceive that the funds being retained by the university for administrative purposes were benefiting them in a concrete way, and therefore indicated that this practice diminishes

the effectiveness of the Chair. Some universities have policies by which a significant share of the CRCP award is retained for administrative costs—sometimes as much as 30% or 40%, although the average was less than 10%.

Lack of support

Many chairholders reported that additional or timelier support would help them to improve their research capacity. Indeed, as reviewed in Section 5.1.6, instances were reported by current chairholders and their HQP, as well as some who have resigned their Chair, in which the university simply did not (or could not) allocate the CRCP funds as agreed during the nomination process, and other types of support (e.g., space or infrastructure, technical or administrative support, student support) may also differ from the commitments made originally. While it is not surprising that high-calibre researchers will have high expectations and speak out when they feel their needs are not being met, numerous sources (e.g., case studies, HQP focus groups, interviews with chairholders who resigned their Chair) do demonstrate instances in which the lack of university support led to outcomes that go against the achievement of CRCP objectives (e.g., departure of chairholders, delays in research progress, lack of critical mass to support strategic objectives, limited training of HQP, etc.). While the chairholders recognize that they are largely responsible for the success of their research program, the available evidence suggests that the coordination of the various elements that support the research program of CRCP chairholders could sometimes be improved to ensure that the infrastructure, research funds, and other types of support come together more effectively for the chairholder.

More generally, variability in the support provided by universities implied that certain institutions were more or less committed, prepared, or able to invest in the research environment of chairholders. In particular, questions were raised by various evaluation informants about the value of attributing chairs to universities that did not focus a sufficient amount of resources in the chairholders' research areas (particularly the hiring of other faculty members, research staff, and infrastructure support) such that a critical mass was lacking. As seen in Section 3.3, the effectiveness of the program was often enhanced by the presence of research centres, clusters, and research teams around the chairholders, and chairholders who found themselves relatively isolated tended to be less satisfied with their research environment and their ability to advance their research program.

One type of support that was often found lacking by both chairholders and HQP was the administrative, research, or technical support staff who could take over certain tasks, such as those relating to infrastructure, purchasing, financial management, administration of a research centre, and supervision and training of more junior HQP. This allows both the chairholder and their students to focus on research, especially in cases where the chairholder supports a large team, as is often expected of them, and these staff members also serve as the group's "memory" to ensure that certain techniques, know-how, and lessons learned in previous projects were retained and easily accessible. As discussed in Section 3.5, some universities have allocated part of the CRCP award to chairholders for student and research staff support, which helped relieve them of both research and administrative tasks. Thus, while this practice was found to increase the effectiveness of the program in some cases, it represented a missing element for other chairholder teams.

Accountability and sanctions for universities

Again, many chairholders reported that their university offered them a suitable research environment, indicating that the variability in the support offered by universities had helped rather than hindered their research program. However, the data collected as part of this evaluation confirm that more serious negative effects on the effectiveness of the program did occur for a small proportion of chairholders, including delays in obtaining resources or withholding of resources that the chairholder had been promised, leading to both perceived or real barriers to the success of the chairholder's research program and, in some cases, the resignation or non-renewal of the chairholder. Again, it should be stressed that these cases are relatively rare, but that the program's design, in providing universities with flexibility and relative autonomy with regard to the implementation of the program at the university level, increases the risk that these events will occasionally occur.

The fact that the CRCP is implemented at the university level means that chairholders who encounter the types of issues described in the previous paragraph, or who perceive that the university is not managing their Chair according to their agreement or expectations, have limited recourse, as well as limited direct support from the CRC Secretariat to ensure that the support provided to them is adequate. The CRCP states that is does conduct financial monitoring, but there is little evidence that this has resulted in changes in unsatisfactory university practices based on the experiences recounted by chairholders. Though this evaluation did not include a systematic examination of these types of issues, a sufficient number of similar reports have been collected and confirmed via multiple lines of evidence that indicate that chairholders feel the need for greater support on the part of the CRC Secretariat to deal with these types of unfortunate situations. Whether it is the role of the CRC Secretariat to intervene is another question, but seeing that the effectiveness of the program rests in large part on the success of individual researchers and on the ability of universities to manage the CRCP within their institution, certain evaluation informants argue that increased monitoring and accountability of universities with regard to the support they offer their chairholders is justified.

Finding 44: In some cases, CRCP chairholders report not having received sufficient support from their university to maximize the success of their research program. Chairholders have limited recourse and support from the CRCP in instances where they perceive that their original agreement and expectations have not been respected.

Broader impact of variability

Even chairholders who reported that they were satisfied with the support offered by their university felt that standard guidelines applied consistently across the program (i.e., across and within CRCP host universities) would benefit the CRCP's status and integrity. Indeed, the fact that Chairs may not be provided with the same support and conditions in different universities, or even within different departments of the same university, has resulted in resentment on the part of some chairholders, as well false assumptions and exaggerated expectations for individual chairholders. The chairholders who felt that their Chair had a negative impact on their ability to leverage funds (see Section 3.5) sometimes pointed to the fact that reviewers might assume that their Chair came with direct research funds; however, this is not the case for roughly 50% of chairholders. Similarly, chairholders who are not provided with any teaching or administrative release may still be expected to be more productive than their colleagues, even if they are not accorded more time to devote to their research program.

Expectations for chairholders remain similar whether their award amount provided to the institution for the Chair is entirely absorbed by the university to support salary and administrative costs or if the university allocates funds for various research costs, including direct research support and student and staff salaries. As discontent with these types of issues will likely persist, especially as chairholders continue to compare their conditions to those of their counterparts in other universities and departments, some expressed concerns that the status and desirability of the CRCP Chairs may be negatively affected, which could have repercussions on the effectiveness of the program to attract and retain leading researchers.

Thus, a number of chairholders have called for stricter guidelines for implementation practices within universities—particularly for teaching release, the share that can be retained for administrative costs by the university, and the amount that is allocated for research and HQP support—that would be enforced across the program. Increasing the reporting of the support and teaching release offered by universities, as recommended in the fifth-year evaluation, could also help manage the expectations and perceptions about the program. In fact, the steering committee response included a decision (Decision 10)[49] to this effect which has not been implemented. Thus, this remains an outstanding issue for the CRCP.

Finding 45: Variability in the support offered by universities, especially for research and teaching release, has resulted in persistent frustration among chairholders. Expectations also remain similar for chairholders who receive widely different types and amounts of support from their institution.

5.2 Question 10: What are the effects of the Chair allocation formula?

Question 10.1: Is the balance of Chairs by discipline adequate?

Since its inception, the CRCP has allocated the Chairs in the following proportion: 20% in the social sciences and humanities disciplines (SSH, via SSHRC), 35% in the health sciences disciplines (via the CIHR), and 45% in the natural sciences and engineering disciplines (NSE, via NSERC). With the corridor of flexibility, which allows universities to reassign a small number of Chairs from one discipline area to another, and with the 120 Special Chairs that are not allocated based on discipline area, the actual distribution of active Chairs is 21.8% in the SSH, 32.6% in the health sciences, and 45.6% in the NSE (based on July 2009 data).

The fifth-year evaluation suggested reviewing the allocation by discipline to allow for a greater proportion of Chairs in the SSH in light of dissatisfaction by certain stakeholders and seeing that professors in this discipline represent at least half of those in Canadian universities. However, the Steering Committee stated that this allocation formula was meant to reflect "each discipline's ability to fund research and development" based on previous investments of the federal granting agencies and not "the distribution of faculty at Canadian universities or future staffing requirements at

[49] Steering Committee Decision 10: "Increase monitoring of university support for Chairs, including research funding and teaching relief, as well as monitoring of the use of the funds provided through the Chairs program. The Secretariat will make this information publicly available in aggregate form (by tier and discipline) on an annual basis."

universities."[50] This issue is re-examined in the present evaluation to see if the context has changed since the fifth-year evaluation and whether the current allocation proportions are adequate.

Perceptions of stakeholders

Program-level informants within the three federal granting agencies openly admitted that their views on this issue would necessarily be biased to a certain degree by their position. A similar inherent bias was observed among other evaluation informants, who tended to judge whether the current allocations by discipline area were appropriate based on their particular affiliation (such as whether their institution has research strengths in particular discipline areas) or their primary research area. Considering this, as well as the fact that certain stakeholders have less reason to be biased because they represent organizations or disciplines spread across the three main discipline areas (for example, VPs Research and representatives from the CFI or national higher education associations), the weight of the evidence does support the assessment that the current allocations by discipline area are not entirely adequate considering the overall objectives of the CRCP, particularly with regard to the needs of the group that is least represented—i.e., researchers in the SSH.

For example, in the web survey, 30% of VPs Research indicated that the current distribution of Chairs was very or somewhat inadequate considering the overall objectives of the CRCP, 14% found this allocation neither adequate nor inadequate, and 53% found it somewhat adequate or very adequate. Considering the overwhelmingly positive ratings this same group provided for several other questions concerning the effectiveness and impact of the CRCP, this substantially more nuanced assessment is telling. In the open-ended question provided to justify their rating, almost half of the VPs Research (19 out of 43 survey respondents, of which 27 took the time to comment) indicated that a greater proportion of chairs in the SSH would be more adequate, whether to better meet the CRCP objectives or to allow them to allocate more Chairs in some of their institution's areas of research strengths. Only two survey respondents (one VP Research from a large university and one from a small university) suggested a change in the allocation by discipline area that did not increase the proportion of Chairs in the SSH; the remaining six comments indicated either that the current distribution across disciplines was adequate in terms of Canadian research priorities or that the flexibility provided to smaller universities had addressed the issue for their institution. Other statements in support of an increase of the proportion of Chairs in the SSH were made by informants from organizations that represent universities or university faculty, as well as by the Canadian Federation for the Humanities and Social Sciences in a response paper to the fifth-year evaluation.[51]

Comments made by other evaluation informants, including CRCP chairholders (in both the web survey and interviews), other chairholders, and grantees, found continued dissatisfaction on this issue, with researchers in the SSH in particular perceiving that the CRCP was not responsive to the needs and realities in the SSH (with regard to both the allocation and more generally), and others being critical of

[50] Canada Research Chairs, 2005. *Response to the Fifth-Year Evaluation of the Canada Research Chairs Program.* See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/fifth_year_response_e.pdf

[51] Canadian Federation for the Humanities and Social Sciences, 2005. *Response by the Canadian Federation for the Humanities and Social Sciences to the 2004* Fifth-Year Evaluation of the Canada Research Chairs Program *(R. A. Malatest & Associates Ltd) with reference to the 2002* Gender-based Analysis of the Canada Research Chairs Program *(Nicole Bégin-Heick & Associates Inc.).* See: http://www.fedcan.ca/images/File/PDF/ResponsetoMalatest-E.pdf

the fact that SSH researchers are under-represented among the CRCP Chairs at their institution, leading to increased resentment among this large segment of the faculty in Canada. Thus, maintaining the current allocation process has not resolved the issues raised in previous evaluations with regard to the allocation by discipline area. Some informants also noted that increasing the proportion of SSHRC Chairs would also help increase access to the program for women, as a greater proportion of researchers in the SSH are women (see Section 6.1 for a detailed discussion on equity issues).

Finding 46: The smaller proportion of CRCP Chairs in the SSH disciplines continues to create dissatisfaction among interested segments of the academic community, particularly researchers in these disciplines (who make up approximately half of all researchers in Canada), as well as institutions whose areas of strength and focus are in these disciplines. Specifically, they find that the program does not adequately meet the need to enhance Canada's research capacity in these areas in line with CRCP objectives.

Assessment in light of CRCP objectives

As presented in the discussion on the success of the CRCP (Section 3.0), differences were often seen across the discipline areas in terms of achievement of the CRCP objectives. These differences show that the program's design is well suited to producing impacts across all three granting agencies, with certain CRCP objectives being met more strongly in certain discipline areas. For example:

- **Attraction and retention of leading researchers**: The CRCP is flexible enough to be adapted to respond to the different needs of researchers in different disciplines and at different points in their career. As the largest proportion of chairholders who considered leaving Canada was in the NSE, the program may have been particularly beneficial to retaining these researchers in Canada.
- **Improved capacity of universities to generate and apply new knowledge**: The evaluation findings varied depending on the indicator. Chairholders in the NSE demonstrated the greatest increases in their number of peer-reviewed papers after receiving their Chair, whereas the CFI component had the greatest impact on both NSE and health sciences chairholders. Chairholders in the SSH found that the CRCP had a significantly greater impact on their research capacity than those in other disciplines. SSH chairholders also reported more frequent sharing of their research results with certain groups outside of academia (e.g., advisory bodies, policy-makers, the not-for-profit sector, and the media), whereas NSE chairholders who reported non-academic uses more often found their research being used for commercial purposes or by private firms.
- **Comparative advantages in strategic research areas**: CRCP chairholders in the SSH disciplines reported greater impacts on a number of indicators, especially on the enhancement of collaborative practices (intra-institutional, national, and international). They also reported a higher impact in the creation of research centres in their research area (although this difference was not significant). Seeing as SSHRC Chairs are more often found in small universities (i.e., these represent 37% of their Chairs, compared with the 22% at the program level), it stands to reason that the structuring effects of the CRCP on strategic research areas that were observed especially in small universities (see discussion under Section 3.3) also apply to their contingent of SSHRC Chairs. Note that a similar conclusion can be drawn for NSERC Chairs, which represent 55% of the Chairs in small universities, compared with 46% at the program level. Overall, several VPs Research commented that allocating more Chairs in SSH disciplines would better allow for the clustering of Chairs in

their strategic research areas and contribute to the critical mass that has been found to be highly effective in the context of the CRCP; very few VPs Research indicated their institution would benefit from a greater proportion of NSERC and CIHR Chairs.

- **Training of HQP**: Whereas the number and type of HQP varied widely across the three main discipline areas, the CRCP was associated with significantly larger increases in the time that SSHRC and NSERC chairholders spent on student and staff supervision (i.e., after they received their Chair) compared with CIHR chairholders. Chairholders in the SSH also more systematically reported greater increases related to the CRCP in the opportunities for HQP to collaborate at the national and international level, as well as in the opportunities to write papers and to present at national and international conferences, than did chairholders in the other discipline areas.

The last two items suggest that CRCP Chairs allocated in the SSH disciplines, and in some cases in the NSE, have a greater structuring impact on the way in which the chairholders conduct research and involve their HQP in research activities. This could be because many of these structuring impacts had already taken place in the NSE and health sciences disciplines, due in part to greater funding available in comparison with the SSH. Finally, in terms of unintended impacts, it was found that some researchers in the health sciences—more specifically clinical scientists—benefit uniquely from the access to salary support, which frees up a significant amount of their clinical time for research, seeing as they no longer have to subsidize their research activities with income from their clinical activities. Overall, the achievement of CRCP objectives is largely balanced across disciplines, although the program meets different needs in different disciplines.

Finding 47: For certain program objectives, researchers in the SSH (and, in some cases, those in the NSE) report greater effects or benefits of their CRCP Chair—such as more substantial structuring impacts in SSH disciplines with regard to collaborative practices and opportunities for HQP—whereas researchers in the health sciences benefit in particular from unique access to salary support for clinical scientists.

Question 10.2: Is the formula based only on granting agency funding adequate?

The current allocation formula, through which the number of chairs allocated to each eligible university is based on the financial support they have received from the three granting councils over the previous three years, has been in effect since the inception of the program and has been examined in past evaluations. The third-year evaluation found that many stakeholders felt that Chairs should be more evenly distributed across universities and examined alternative allocation formulas (with none shown conclusively to be more adequate), that more flexibility in the allocation of Chairs within universities would be beneficial, and that certain issues might challenge the ability of smaller universities in particular to effectively implement CRCP Chairs. Following the third-year evaluation, the CRCP implemented the corridor of flexibility, which appeared to alleviate some of the issues with regard to flexibility within the allocations made to the universities, as observed in the fifth-year evaluation. It should be noted, moreover, that in 2003, the CRCP held an open competition for 10 Chairs for small universities that had not received any Chair allocations by the competition deadline.

The findings from the current evaluation suggest that some evaluation informants are still critical of the Chairs allocation formula based on granting agency funding, which awards Chairs on the basis of prior relative success instead of through a competitive process or another method. Among the VP Research

survey respondents, 57% found the current formula adequate, 33% found it inadequate, and 10% indicated they did not know or did not respond. Note that whereas all six respondents from large universities agreed this formula was adequate, only half of those from small and medium universities agreed. This is not surprising, since the current method favours larger universities, which receive a greater proportion of federal grant funds when taking into account the size of their faculty. The latest administrative data show that about 41% of Chairs have been housed at five large universities (the University of Toronto, which holds 14% of all Chairs; the University of British Columbia; McGill University; the Université de Montréal; and the University of Alberta). Small universities comprise 65% of the participating institutions, and these house 13% of CRCP Chairs, which reflects the fact that they receive a smaller proportion of federal grant funds.

This evaluation also confirms the findings of the fifth-year evaluation and external studies, which have shown that the program has had a more significant impact on the small and medium universities than on the larger universities, as it has helped them to establish the "critical mass" that they need to "create or expand centres of research excellence." Their research centres more than doubled in size (113% increase), compared with a 57% increase among Chairs from large universities, and they also experienced a greater relative increase in their numbers of peer-reviewed publications, technical presentations or papers, and national/international conferences.[52]

Similarly, the present evaluation found that the CRCP had a significant effect on the research environment of small universities, creating an increased focus on research and offsetting their limited resources and infrastructure capacity (see Section 3.3). A 2010 study by Grant and Drakich also found that graduate students in smaller universities appear to be more significantly impacted by the CRCP than those in larger institutions.[53] However, while some universities indicated that they would welcome additional chairs, few other evaluation informants indicated that, beyond the measures currently in place (such as the Special Chairs; see Question 10.3), the CRCP was the most appropriate mechanism by which to build research capacity in smaller institutions. However, interesting comments were made about using the CRCP to enhance the linkages and collaboration between large and small institutions in strategic research areas, as outlined in Section 4.1.

Alternatives proposed by some evaluation informants to distribute Chairs more evenly across universities primarily include allocating Chairs in proportion to size of faculty and/or student body, holding an open competition for Chairs across all Canadian institutions, or taking into account funding allocated by sources other than the federal granting councils (which would logistically be much more complicated, as one of the advantages of the present system is that it is simple). As reviewed in the third-year evaluation, proposed alternatives have had their challenges and disadvantages, and evaluation informants often pointed out that these approaches would detract from the strategic objective of the CRCP and the institutional focus of the program. For example, open competitions would not allow universities to focus their resources or form a critical mass to build or enhance strategic areas and might particularly challenge the development of research capacity in Canada's smaller universities. Allocating

[52] R. A. Malatest & Associates Ltd., 2004. *Fifth-Year Evaluation of the Canada Research Chairs Program*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/fifth_year_review_e.pdf

[53] Grant, K. R., & Drakich, J., 2010. The Canada Research Chairs Program: The good, the bad, and the ugly. *Higher Education*, 59(1): 21–42.

Chairs in proportion to their size also fails to take into account the research capacity of these institutions, and could lead to situations where the effectiveness of the program is undermined by the ability of universities to adequately support their chairholders.

Generally, evaluation informants pointed to the known issues with the system (e.g., constrained by past performance, disadvantages for smaller or more teaching-oriented universities, lack of a competitive element) but were not able to outline specific changes through which it could be improved. The fact that the current allocation method is based on financial inputs is somewhat circular (i.e., those who have more funding subsequently receive more funding). A possible alternative could be an allocation formula based on research output productivity and scientific impact (in whatever form appropriate to particular disciplines); further consideration of this alternative could determine if such an approach would better promote an efficient and productive use of public funds. Examples of such research assessment systems that have managed to achieve widespread consensus, all the while covering researchers from the whole spectrum of disciplines, can be found in Australia and Norway.

Finding 48: While most evaluation informants agree that there is no perfect system, basing the allocation formula only on granting agency funding at the university level, though somewhat circular, adequately meets the CRCP's strategic and institution-focused objectives.

Question 10.3: What are the effects of the "Special Chairs" allocation? Is there a need to continue to allocate them? How should they be allocated?

Due to concern that small universities would face certain challenges obtaining CRCP Chair positions, 120 "special" Chair allocations have been set aside for universities. The allocation method for the Special Chairs was revised in 2009 (see below) to limit the program to universities that have received 1% or less of the total of federal research granting agency funds over the three fiscal years prior to the year of the allocation (but more than an average of $100,000 of grant dollars over this period; see Section 1.1 for details). The Special Chairs are not allocated by discipline, but are otherwise subject to the same criteria and conditions as all other Chairs, and because of the special allocations, smaller universities have increased flexibility to recruit Chairs in any discipline and any Tier. Note that a university can hold both regular and Special Chairs.

According to the latest administrative data (as of July 2009), 86 Special Chairs were active (i.e., filled), over 70% of which were at the Tier 2 level. Nearly half (48%) of all Special Chairs belong to NSERC disciplines; SSHRC and CIHR follow, with 43% and 9%, respectively. Small universities hold 90% of the Special Chairs, whereas 8% were at medium universities, and 2% at large universities. Over the lifecycle of the program, approximately 60% of universities have been allocated a Special Chair. Seeing that the Special Chairs were not always being allocated to the universities for which they were intended, the CRCP introduced a graduation mechanism, which limits the number of Special Chairs a university can receive based on how many regular Chairs they have; universities with 11 or more regular chairs can no longer hold Special Chairs.

Evaluation informants at both the program and university levels point to the value of the Special CRCP Chairs in allowing small Canadian universities to develop their research capacity; some even indicated that the success of this feature of the CRCP was actually greater than expected. Indeed, the CRCP reported in 2008 that "smaller universities have performed much better than was originally expected

and the program is currently overcommitted."[54] Thus, a more competitive model was introduced in 2009 that takes into account the amount of funding that each institution contributes to a pool of the funding provided by all three granting agencies to all universities eligible for Special Chairs: the percentage of Special Chairs the university is allocated corresponds to the percentage of the funding pool that they have secured. Both of the changes were designed to facilitate a more equitable distribution of Special Chairs to eligible universities.

In the VP Research survey, respondents whose institution had been awarded one or more Special Chairs commented on the impact of this feature of the CRCP. All but two were extremely positive, citing them as "crucial," "key," or "critical" and reporting "very high" impact benefits on their university, such as through an increased capacity to recruit world-class researchers. This is made possible through the flexibility provided to use these Chairs to strengthen strategic research areas or multidisciplinary areas (including in SSH disciplines), an enhancement of research culture and "intensivity," greater visibility and credibility as a research institution, and being able to obtain additional Chairs (including regular Chairs) in subsequent years. The two who were less satisfied pointed that they had lost Special Chairs for various reasons.

More than 80% of the VPs Research—including some at universities that had not received any Special Chairs—considered that the CRCP should continue to allocate the Special Chairs, and program-level interviewees also strongly supported the continuation of this feature of the CRCP. In terms of the allocation mechanism, the only comments that were critical of the changes made to the allocation guidelines in 2009 are those who lost Chairs; those who are currently eligible for more simply pointed out that it would be beneficial to them to be able to apply for a greater number of Special Chairs and praised the flexibility that is currently offered. Relatively few evaluation informants were asked to provide views on this question, which limits the ability of this evaluation to review or comment on the possibility of other allocation mechanisms. However, seeing the relative satisfaction across the stakeholders consulted and the reported success of this feature, there is no indication that the current allocation mechanism is not adequate.

Finding 49: Special Chairs have allowed smaller Canadian universities to build capacity in their strategic research areas to an extent greater than originally expected. There is a strong consensus among evaluation informants that the Special Chairs should be continued and allocated through the method that is currently in place.

[54] Canada Research Chairs, 2008. *Canada Research Chairs Progress Report: April 2006 to March 2007*. See: http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/publications/briefing_report_%2006-07_e.pdf

6.0 Findings — Systemic Barriers

6.1 Question 11: Are there any systemic barriers in accessing the program by the four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people)?

This section addresses the issue of systemic barriers affecting the CRCP that may inhibit access to the program or the success of chairholders who are members of the four designated groups: women, members of visible minorities, persons with disabilities, and Aboriginal people. This is an issue of particular concern for the CRCP, given the low number of women among the cohort of chairholders in the early years of the program, as well as the complaint that was filed with the Canadian Human Rights Commission in 2003. This complaint resulted in a settlement agreement from the Canadian Human Rights Tribunal in 2006, under which the CRCP agreed to implement a series of measures and actions to address the equity issues that had been raised.[55] This evaluation includes a review of systemic barriers and also draws on the Gender-Based and Diversity-Based Analysis of the CRCP completed by the Higher Education Strategy Associates (HESA) in 2010.[56]

The review of systemic barriers (i.e., the study on equity issues) conducted as part of this evaluation drew on interviews with program-level, university-level, and chairholder-level informants (including researchers who are members of the four designated groups) and survey data. The goal of the study was to assess the extent to which systemic barriers were perceived to exist, to better understand the extent to which any biases and barriers are concentrated in the CRCP or mirror those that exist within federal granting programs or academia more generally, and to assess the impacts these barriers have or could have on members of the designated groups in the context of the CRCP.

Presence/absence of systemic barriers

The prevalence of systemic barriers was assessed based on the perceptions of web survey respondents. Overall, between 5% and 12% of researchers agreed that systemic barriers existed for designated groups in the design and/or implementation of their chair program (CRCP and other chairholders) or of federal grants (grantees). Interestingly, VPs Research were more likely than chairholders to have observed barriers that limit access to the CRCP for the four designated groups, with 21% agreeing or strongly agreeing that barriers existed due to the way the program is designed, and 9% agreeing due to the way the CRCP Chairs are awarded at their institution. CRCP chairholders and VPs Research who reported barriers saw them as existing primarily for women (about 85%), followed to a lesser extent (55% or less) for Aboriginal people, persons with disabilities, and members of visible minorities.

Among members of the four designated groups, systemic barriers were more likely to be perceived for chair programs (both the CRCP and other chair programs) than for grants, which suggests that the features of program design and implementation that are common to both the CRCP and other types of chairs but different from research grants lead to perceptions of systemic bias. Overall, 15% of successful CRCP chairholders from the designated groups reported that they had encountered barriers

[55] Canadian Human Rights Tribunal, 2006. *Settlement Agreement*. Tribunal File No. T11118/9905.

[56] Higher Education Strategy Associates (HESA), July 8, 2010. *Canada Research Chairs Program: Gender-Based and Diversity-Based Analysis*. Final report.

in the allocation of their Chairs, compared with 2% of CRCP chairholders who did not declare themselves to be a member of one of the designated groups.

It should be noted that approximately 25% of web survey respondents (on average) did not answer or answered "don't know/not applicable" to the equity questions, which could affect the interpretation of the survey data by either underestimating or overestimating the prevalence of barriers, depending on the reasons behind the non-response. Moreover, the study of equity issues has likely underestimated the extent of systemic barriers across the entire population of researchers who could have CRCP Chair potential because a large share of the data comes from current CRCP chairholders, who by definition have overcome barriers that may limit access to the program.

Nature of systemic barriers

The nature of these perceived biases and barriers was also assessed based on survey and interview responses. These barriers were attributed to aspects both internal and external to the program and were often described as subtle, unverifiable or unproven, and intersecting with other factors (e.g., discipline). The study of equity issues also found that barriers are both enabled and unchecked by certain design features of chair programs (i.e., both the CRCP and other chair programs). The most common barriers to being nominated, selected, and renewed are reviewed below, followed by evidence of their impact.

The most widespread view, including among program-level interviewees, was that some inequities simply reflect the demographics: in other words, the smaller populations ("pools") of academics within the designated groups are the result of demographic, social, and cultural biases or matters of individual choice. This viewpoint posits that individuals are being systemically "leaked" from career pipelines that would lead them to be nominated by institutions; thus, this barrier occurs upstream of the CRCP.

Other than "representative sampling," upstream barriers were seen to occur when the qualities of researchers in designated groups were overlooked or excluded in a way that relates to their status. For example, women with young children, Aboriginal scholars with community responsibilities, members of visible minorities with strong accents, or people whose disabilities reduce their ability to travel might be less likely to engage in international networking activities, research collaborations, or outreach opportunities, all of which would allow them to become more visible to nominating universities. For similar family, community, or health reasons, researchers in designated groups may also be less willing or able to relocate to take up a CRCP Chair. The study found that female researchers in particular are more likely to be married to spouses who work in highly specialized fields or are higher in the professional ranks, compounding the difficulty of finding suitable work for the spouse in the case of relocation.

The design and/or implementation of the program was said to exacerbate certain upstream barriers depending on the way universities identify potential chairholders. More specifically, compared with advertised and open processes for the nomination of chairholders, internal or external "star searches" for potential chairholders likely overlook researchers who are equally or more qualified but are less visible or mobile. Indeed, the study found that the most vulnerable feature of the CRCP design with regard to equity issues is that individual universities have control over the identification and nomination process. This has opened the door to certain practices that lack transparency and increase the likelihood of perceived or real barriers for members of designated groups. For example, the lack of an open process not only increases the potential for racist, sexist, or other prejudicial attitudes (where they exist)

to negatively affect access to the program for designated group members, but it also limits the ability to determine with certainty the extent to which these discriminatory practices are present. Note that the CRCP now states in its program guidelines that "all Canada Research Chair recruitment and nomination processes at universities must be transparent, open and equitable."[57]

The data also suggest that members of designated groups may be more likely to have career 'gaps' or 'pauses'—due to maternity leave, community responsibilities, or health reasons, for example—during which these researchers were less productive or interrupted their career trajectory. These periods of lower productivity, especially during the crucial "early career researcher" stage, may negatively impact individuals' ability to compete for a Chair if these are not taken into account by nominating committees or peer reviewers. Although the CRCP has explicit provisions to recognize parental and medical leave (in accordance with local institutional policies), it is evident that some researchers believe that either these provisions do not exist or that they are not adequately considered. Whether such beliefs stem from a lack of information, misinformation, or veridical observation is not clear, but as above, a lack of transparency in the nomination process may promote these beliefs.

Moreover, researchers in disciplines that are not perceived to be highly valued by universities or that may involve a higher proportion of members from a particular group (e.g., women in the SSH[58]) found that perceived systemic biases and barriers, both in the academic sector generally and the CRCP specifically, may intersect with disciplines, further complicating matters. Similarly, interviewees belonging to the designated groups found that members of nomination committees tended toward conservatism—they are more likely to promote researchers who are "like themselves" or who will directly and indirectly increase the institution's funding, and less likely to support work that they perceive as too innovative or radical. The review committees, including those for the CRCP, were also perceived to be inherently conservative. More specifically to the CRCP, those who believed that their file had been handled unfairly within the peer-review process felt that the program afforded them little or no capacity to clarify negative information or fight the committee's decision.

Finding 50: Systemic barriers were reported by about 15% of chairholders in designated groups. The nature of these barriers is such that they are inherent to all chair programs and the wider academic environment. However, the selection and nomination process used by universities is a weak point in the CRCP's design in this regard.

Two main areas of potential impact were identified for these perceived barriers: first, in access to the program by researchers in designated groups (either through the nomination process administered by universities or the selection process administered by the CRCP), and second, in the success of chairholders in designated groups during their Chair tenure. Note that both the study of equity issues and the HESA study indicated that a proportion of members of visible minorities and persons with disabilities choose not to identify their status to the CRCP, which has potential implications for the capacity of the program to assess how well it is performing in terms of equity (i.e., it may be performing better among members of visible minorities and persons with disabilities than its data indicate); in contrast, gender data are much more complete and reliable.

[57] Canada Research Chairs, 2010. *Program Details: Nominate a Chair*. See: http://www.chairs-chaires.gc.ca/program-programme/nomination-mise_en_candidature-eng.aspx#how

[58] HESA, July 8, 2010. *Canada Research Chairs Program: Gender-Based and Diversity-Based Analysis*. Final report, p. 62.

Impact of barriers on access to the program

The HESA study sought to measure effects of barriers on access to the program (if any), conducting a number of analyses to determine if there was evidence of bias in the nominating and awarding of Chairs. Results are discussed below first for women, then for the other designated groups.

Male and female nominees were funded by the CRCP at the same rate, indicating that bias has not affected the selection of chairholders at the program level. However, women have been under-represented among nominees, particularly in the early years of the program, which led to an under-representation of female chairholders. In 2001, the program's first full year, only 14% of the nominees and awardees were women (Figure 6). Since then, nominations of women for Chair positions have increased to nearly 23%, and the proportion of women holding active Chairs in July 2009 was 25%.

Why are women under-represented among nominees? The HESA review concluded that none of the CRCP's policies would disadvantage the nomination of women. For example, the gender analysis of Tier 2 nominees who are 10 years beyond their final degree shows that this CRCP policy has helped both male and female nominees, although it has been more beneficial for female nominees. If CRCP policies are not responsible, it follows that universities themselves are nominating males disproportionately over females. The HESA study found that equity and diversity policies in universities were quite varied in their comprehensiveness and that their implementation could be constrained by complex organizational structures (especially in larger universities) and a lack of institutional capacity (especially in smaller universities).

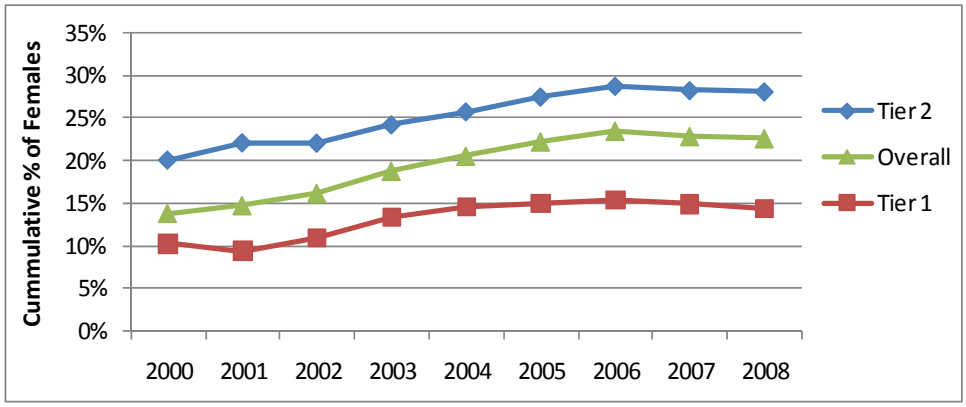

Figure 6 Percentage of female CRCP Chair nominees by year, 2000–2008

Source: HESA, 2010. *Gender-Based and Diversity-Based Analysis*, page 44

As shown in Figure 6, a higher proportion of female researchers are nominated for Tier 2 Chairs (28%) than Tier 1 Chairs (14%). In July 2009, 31% of Tier 2 chairholders and 17% of Tier 1 chairholders were women. In 2006, women made up 20% of full professors, 36% of associate professors, and 43% of assistant professors, for an average of 32% overall (University and College Academic Staff System data, cited by HESA[59]). The Tier 2 Chairs, therefore, help to increase the proportion of women among CRCP chairholders. Comparing women holding Tier 1 Chairs with those who are full professors, the difference is small, suggesting that the proportion of female Tier 1 chairholders tends to reflect the

[59] HESA, July 8, 2010. *Canada Research Chairs Program: Gender-Based and Diversity-Based Analysis*. Final report, p. 60.

demographics (see "Nature of systemic barriers" section). However, with respect to Tier 2 nominees, female nominees are always under-represented compared with the proportion of associate and assistant professors. Overall, the HESA study showed that women are only slightly under-represented at the program level, but women are under-represented at about half of large and medium universities.

If the data are broken down along discipline areas, it becomes clear that there is a higher proportion of female SSHRC Chairs than CIHR or NSERC Chairs. This also reflects the demographics, as more female researchers hold SSHRC operating grants than CIHR or NSERC operating grants (based on SSHRC, NSERC, and CIHR program data, cited by HESA[60]). However, these data also confirm that women are still under-represented among nominees, although the patterns are quite variable over time, between tiers, and across granting agencies (Figure 7). As the proportion of female professors in SSH disciplines is higher, the fact that 20% of Chairs are allocated to SSHRC (compared with 35% for the CIHR and 45% for NSERC) necessarily contributes to the gender imbalance. The authors of the HESA study did not recommend that these allocations of Chairs by discipline area be changed to increase the proportion of Chairs allocated to women; however, they noted that revisiting the allocations by discipline area for other reasons that might result in more Chairs being allocated to SSH disciplines would help to redress the current gender imbalance.

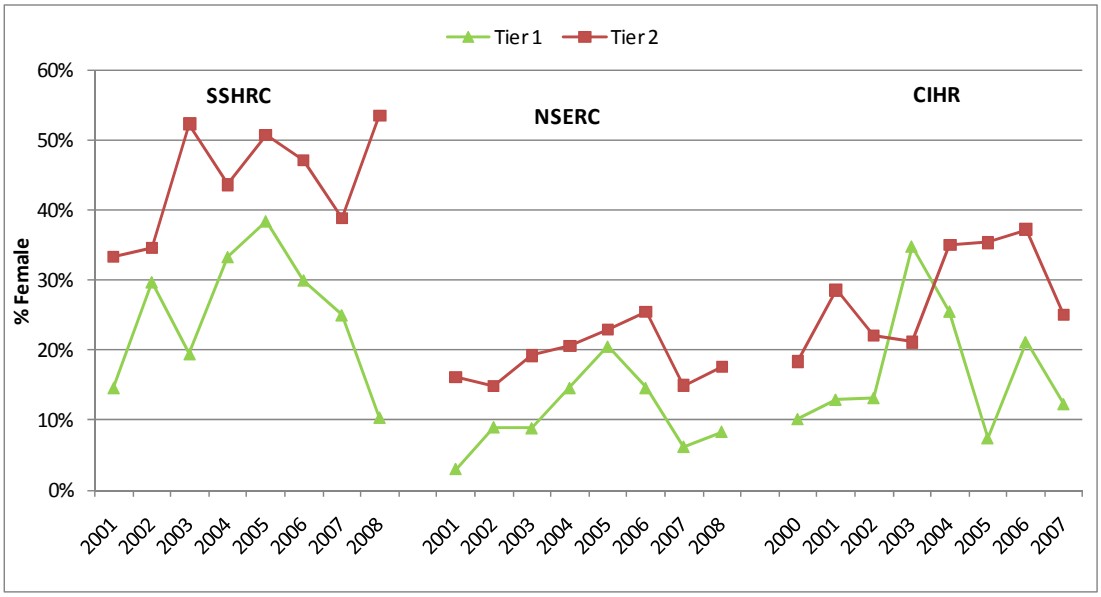

Figure 7 Percentage of female CRCP Chair nominees by year, tier, and granting agency, 2000–2007

Source: HESA, 2010. *Gender-Based and Diversity-Based Analysis*, page 57

Comprehensive CRCP data on nominees who are visible minorities, persons with disabilities, and Aboriginal people are limited to the years 2007 and 2008; in addition, no ideal source of data exists that would provide an accurate portrait of the proportion of these groups among the population of potential chairholders. As noted previously, it is possible that the under-representation of these groups has been somewhat overestimated because not all members self-disclose. Based on the limited data

[60] HESA, July 8, 2010. *Canada Research Chairs Program: Gender-Based and Diversity-Based Analysis*. Final report, p. 62.

available for 2007 and 2008, 15% of CRCP nominees were visible minorities (10% of Tier 1 nominees and 19% of Tier 2 nominees[61]), which suggests that for the program as a whole, members of visible minorities are not under-represented. However, one-third of large universities and just over one-half of medium universities report a gap in their targets for this group.[62] Thus, as seen for the gender imbalance, there is considerable room for improvement at the institutional level. The data on nominees who are persons with disabilities or Aboriginal people are insufficient to draw conclusions about these groups.

Finding 51: The representation of women among CRCP chairholders increased from 14% in 2001 to 25% in 2009. However, women and members of visible minorities continue to be under-represented in some medium and large institutions. Data are too limited to assess the representation of persons with disabilities or Aboriginal people.

Impact of barriers on the success of chairholders

Perceived barriers could also affect researchers in the designated groups after they have received their Chair, thus impacting their success as a chairholder and in conducting their research programs. Two main types of impacts were noted: impacts on chairholders' professional and personal lives, and impacts on university support and working conditions.

The study on equity issues found that some members from the designated groups had felt a pressure to perform that would not necessarily be felt by their other colleagues. Similar to what was reported in the unexpected impacts for chairholders (Section 3.5), the CRCP created or exacerbated competitive dynamics within departments or institutions, which may be expressed with racist or sexist undertones in the case of designated group members. Chairholders with disabilities also claimed to experience negative attitudes and less understanding among their superiors or colleagues when their productivity was reduced, resulting in a pressure to perform as though they did not have a disability. While some felt overlooked for professional opportunities, others noted that they had been aggressively solicited by their departments or faculties for participation in committees as a means to ensure the gender or race balance of these committees, and that this over-solicitation often reduced the time they could productively spend on research.

Efforts made by the CRCP and by institutions since 2006 to counter inequities in the program have led universities to recruit greater numbers of women and minorities. However, an unexpected negative impact of this is that some chairholders reported having been informed that their Chair was awarded due to their designated group status, in effect suggesting that the Chair was unmerited. These efforts may also have led to some instances of reverse discrimination, where researchers who are not members of the designated groups experienced barriers to accessing the program.

Some of the strongest evidence of the impact of barriers and biases on the success of chairholders relates to the amount of support they receive from universities. As noted previously (Section 5.1), the types and amounts of support that universities offer their chairholders vary considerably, leading to

[61] HESA, July 8, 2010. *Canada Research Chairs Program: Gender-Based and Diversity-Based Analysis*. Final report, p. 57.

[62] Small universities are not considered here—because they are awarded fewer Chairs, they cannot reasonably be expected to have all four designated groups represented among their chairholders, particularly when the pool of eligible researchers is small.

some frustration among both CRCP and non-CRCP faculty. Both the study on equity issues and the HESA study found evidence that designated status chairholders encountered a variety of challenges and unfair practices while negotiating their conditions with their host institutions (including teaching release, salary levels, discretionary payments, space, and infrastructure) at the time of their application and/or renewal, as well as with obtaining the promised support during their Chair tenure.

While these challenges are not unique to members of the designated groups, many chairholders observed that their universities lacked clear processes for carrying out these negotiations and that members of the designated groups were more vulnerable to unfair practices attributable to racism, sexism, or other prejudices. The HESA study conducted a gender analysis of exit surveys to see if the reasons for resigning provided by former chairholders might point to gender issues; the authors found that inadequate university support was more often an issue for female chairholders who resigned their chairs than for male chairholders. This suggests that some universities may be better at meeting the needs of their male chairholders than their female chairholders, or that male chairholders were better at ensuring that their needs were met.

Some interviewees suggested that the allocation of teaching and administrative duties might be subject to systemic biases, as could additional support (i.e., other than the CRCP funds) provided by the university. The web survey data do not show any significant differences in time allocated to various tasks (i.e., research, administrative, teaching, etc.) between genders, with female and male chairholders reporting less than one percentage point difference than the average allocation for each of the tasks listed in Table XVII. There were no significant differences, either, between male and female chairholders in terms of how their time allocations changed after they obtained their CRCP Chair. However, 25% of female chairholders reported having not received any additional support from their universities compared with 21% of male chairholders, though this difference is not statistically significant ($p > 0.05$). A better indicator would compare the total amounts of additional support (perhaps by type of support) received by chairholders by gender, but this was not possible to determine using the available data.

Effectiveness of CRCP actions to attenuate/redress equity issues

As noted above, a settlement agreement was signed by the CRCP in 2006 to address a complaint brought to the Canadian Human Rights Commission in 2003 concerning the representation of the four designated groups among Chair recipients. Following this agreement, the CRC Secretariat was required to implement several changes to the program to help ensure equitable access to members of these groups.[63] While the evaluation did not assess the extent to which these actions have been fully implemented or measure their effectiveness, the evidence obtained shows that the CRCP has complied with the items in this agreement (including the review of systemic barriers in this evaluation and the HESA study), some of which are efforts to be implemented in an ongoing manner.

Most notably, the CRCP commissioned a target-setting and reporting tool to be used by universities to monitor and report on the representation of the four groups among their chairholders. The tool was sent to universities in November 2008, and 65 of the 70 participating universities had submitted their

[63] Canadian Human Rights Tribunal, 2006. *Settlement Agreement*. Tribunal File No. T11118/9905.

data by March 2009.[64] The CRCP also sent a list of examples of equity practices to increase the participation of members of the four designated groups. The CRCP is now responsible for monitoring adherence and progress in terms of established targets, including the implementation of strategies by universities and the revision of targets at least every three years.

As noted above, the CRCP specified in its guidelines to universities that the recruitment processes must be transparent, open, and equitable. In the settlement agreement, the CRCP also agreed to require universities to confirm that each nominee was recruited in accordance with such processes. Moreover, the CRCP agreed to work with universities to find solutions and, under the appropriate circumstances, to take remedial action in order to increase awareness of and adherence to these guidelines.

It is too early to determine whether these actions and others that have been taken will have a long-term effect on access to the program by the under-represented designated groups; note that in the case of gender equity, most of the progress was seen before 2006. Given the enduring perception of barriers among stakeholders, as well as the fact that women and members of visible minorities remain under-represented in some institutions, this tool and other periodic studies/reviews to monitor access to the program are justified. Indeed, future progress cannot be assessed or achieved without monitoring and greater awareness, both of which are key functions of the target-setting and reporting tool. It is not clear, however, whether the CRCP's monitoring efforts will lead to sanctions in cases where universities cannot or do not confirm that such recruitment and nomination practices have been used.

Similarly, cases in which universities treated or were perceived to have treated designated group chairholders unfairly because of their status are not systematically monitored. The CRC Secretariat does monitor exit surveys, but the mechanisms behind this review (e.g., whether a formal or informal process is used, the frequency of review) and any subsequent follow-up action also remains unclear.

Overall, both the study of equity issues and the HESA study found that there was room for clearer guidelines, greater awareness, and greater oversight (including better data), as well as direct intervention by the CRC Secretariat in the implementation of the program at the university level. These include, but may go beyond, the actions outlined in the settlement agreement. The HESA report, in particular, makes a number of recommendations that could strengthen efforts to reduce under-representation of the four groups. Program-level interviewees indicated that the program and/or universities could be more proactive in attracting members from the designated groups and increasing awareness of the issue. Finally, many of the suggested actions (particularly increased guidelines, oversight, and interventions) may also coincide with efforts to address the issues raised in previous sections with regard to lack of transparency and variability in university practices relating to the CRCP.

Finding 52: The measures implemented by the CRCP to monitor equity issues are justified, and they are helping the CRCP to effectively address these issues in its design. Additional efforts by the CRCP and universities would help further reduce or prevent the under-representation of designated groups.

[64] HESA, July 8, 2010. *Canada Research Chairs Program: Gender-Based and Diversity-Based Analysis*. Final report, p. 29.

7.0 Conclusions and Recommendations

The present evaluation finds that the CRCP has been well implemented and continues to be relevant and effective. Given the continued need for the program, certain outstanding issues within the program's design and delivery should be addressed in order to ensure its long-term success. These recommendations are listed below, along with their supporting findings and additional considerations.

Recommendation 1: Revise and/or index the CRCP award amounts to ensure that the program can continue to effectively meet its objectives to attract and retain excellent researchers and to enhance the capacity of universities to produce and apply new knowledge.

As per the following key findings:

Finding 37: The CRCP award amounts have not changed since 2000 and have not kept up with inflation and salary increases. All sources of evidence confirm that CRCP awards—especially for Tier 2 Chairs—are being increasingly allocated to chairholders' salaries (now 74% of the award).

Finding 38: The fixed award amount is limiting the ability of the CRCP to achieve its objectives of a) attracting and retaining excellent researchers, and b) enhancing the capacity of universities to produce and apply new knowledge.

Additional considerations:

- Relevant changes in the research environment since 2000 include the creation of programs similar to the CRCP in other countries and increased competition (nationally and internationally) faced by universities for top-level researchers. Additionally, the salaries of professors and associate professors in Canada have steadily increased at a rate greater than inflation. Based on 2006 Census data, the average salary for an associate professor in Canada was $95,682 (compared with $77,617 in 2000), but the annual Tier 2 award amount is currently fixed at $100,000.
- This recommendation has implications for either the CRCP's budget or the scope of the program: increasing the award amount would either require an increase to the CRCP budget or force a reduction in the number of Chairs. However, reducing the number of Chairs is not a popular idea among the program's stakeholders (even those who do not directly benefit from Chairs), and it would reduce the capacity of the program to support the recruitment and retention of researchers. A third option would be to redistribute currently unused funds within the program; it is noteworthy that some leeway currently exists in the CRCP budget, given that approximately 150 of the 2,000 Chairs are not awarded at any given time.
- The risk of maintaining the award amount at the present fixed level is that the effectiveness of the program to achieve two of its four main objectives will be significantly decreased. First, it would directly affect the ability of the program to attract and retain leading researchers, as the CRCP award amount is becoming less competitive over time (note that the CFI component is indexed). It is understood that the CRCP funding acts a starting point and is not expected to cover all of the chairholders' research costs. However, the fact that an increasing proportion of the award amount is being allocated to researchers' salaries to the detriment of other uses—uses that have effectively supported chairholders' research programs in the past (i.e., through the provision of stable and long-term salaries for support staff and students)—also directly affects the program's effectiveness in supporting the capacity of universities to produce and apply new knowledge.

- Increasing the award amount should also help to redress certain shifts in the allocation of CRCP funds at the university level (i.e., the decreasing amount of non-salary support that chairholders receive) and therefore provide the means for universities to alleviate some of the issues related to the variability of university support (see also Recommendation 5).

Recommendation 2: Address the short-term and long-term risks and problems associated with the transition and retention of Tier 2 chairholders after the end of their second terms.

As per the following key finding:

Finding 39: The two-tier system is effective and appropriate to ensure long-term capacity building. The fact that Tier 1 chairholders often perform better than Tier 2 chairholders is expected based on their career status, but it is worth highlighting that Tier 2 chairholders often perform better or as well as leading researchers in groups that include both junior and senior researchers.

Finding 40: Although the two-tier system is a useful design element of the CRCP, the misaligned duration and renewal policies of the two tiers is creating a gap between the two tiers that threatens to result in the departure or dissatisfaction of chairholders at the end of their second terms, as well as lessening the attraction of candidates to Tier 2 Chairs more generally.

Additional considerations:

- Tools to be considered include: a) changing the duration of Tier 2 Chairs to seven years to facilitate the timing of the transition to Tier 1 Chairs and other opportunities available to senior researchers for retention, b) offering a second renewal to Tier 2 chairholders (five-year terms), or c) implementing a new bridging mechanism between Tier 1 and Tier 2 Chairs. The CRCP may wish to develop another tool (independently or with universities) to minimize the risks associated with the departure of leading researchers from their CRCP host institution.
- There is a high level of risk that the current situation will impede the CRCP's effectiveness with respect to the attraction and retention of excellent researchers in Canadian universities in both the short and the long term. Monitoring by the CRC Secretariat of this situation and its effects on universities, as well as monitoring of the effectiveness of any mitigation measures would therefore also be of interest.
- Though it is too early to effectively measure the extent of this effect (the first 200 Tier 2 chairholders to reach the end of their second terms will do so between now and December 2012), the retention of current chairholders is the most pressing concern, particularly for university administrators. The evidence points to the risk that a large proportion of Tier 2 chairholders will look elsewhere (e.g., another institution in or outside of Canada) for a position to take on after—or even before—the end of their Chair tenure. Indeed, these chairholders are aware that they are likely to lose a number of advantages at the end of their second term (e.g., salary, teaching or administrative release, support for students/staff, the prestige of the Chair title). It would be paradoxical if one of the outcomes of a program aimed at reducing brain drain would be to initially increase the attractiveness of Canadian universities for researchers, only to subsequently lose them to international competition.

- This is likely to affect smaller universities to a greater extent than larger institutions, which have a greater capacity to attract talented researchers—including draining former chairholders from small institutions. The loss of these researchers would require universities to rebuild this capacity rather than to continue consolidating and enhancing existing strengths. Indeed, the bibliometric analysis confirms that Tier 2 chairholders perform at a high level; these researchers also have a greater leveraging capacity than comparable researchers (i.e., associate professors).
- Over a longer timeframe, the attraction of emerging researchers may also become more difficult if the perception becomes widespread that Tier 2 Chairs confer relatively short-term benefits. The original justification for a seven-year Tier 1 term is that senior researchers would not be attracted by a five-year term, whereas a five-year term is sufficient to attract emerging researchers; however, there is currently limited evidence to support this justification, particularly in the case of the most promising emerging researchers for which Canada is competing on an international scale. Efforts should be made to obtain such evidence so as to inform future actions.
- The potential effects of maintaining the status quo on this issue (i.e., the departure of Tier 2 chairholders at the end of their second term) could therefore also reduce the effectiveness of the program in terms of a) improving universities' research capacity, and b) optimizing the use of resources through strategic planning.
- Prolonging the duration of Tier 2 terms from five to seven years better follows the natural progression of emerging researchers' careers: compared with the 10-year time span, a 14-year time span would more effectively bring successful Tier 2 Chair recipients to a senior faculty level (i.e., they would typically be in their fifties rather than in their forties, considering that Tier 2 nominees should be less than 10 years from their highest degree at the time of nomination). After 14 years, they are more likely to be eligible for a Tier 1 Chair (or equivalent positions), which would assist universities that wish to use Tier 1 Chairs to retain these researchers and better position Tier 2 chairholders to access the opportunities offered to senior researchers.
- This is a complex issue with no perfect solution. For instance, Tier 1 Chairs must be available before Tier 2 chairholders can be nominated for them. Universities may also choose to offer their available Tier 1 Chairs to other researchers; indeed, Tier 2 Chairs are not intended by the program as guaranteed stepping stones into Tier 1 Chair positions. However, either a) changing the Tier 2 duration to seven years, or b) allowing for a second renewal, would help to correct the bottleneck that has resulted from having misaligned term durations and that is currently making planning more challenging for universities that wish to offer Tier 1 Chairs (or equivalent positions) to successful Tier 2 chairholders at the end of their second terms.
- Universities are responsible for planning their long-term staffing. The evidence shows that while some have already developed ways to address this issue, others are less well prepared. More explicit guidelines from the CRCP on the type of planning that is expected from universities are advisable (see also Recommendation 5). Universities could include a succession or transition plan as part of the SRP to help address this situation, but it remains to be seen whether universities will be able to retain Tier 2 chairholders who seek to maintain the advantages (including the prestige) of a CRCP Chair position after their Chair tenure.

Recommendation 3: Provide the means to ensure that existing chairholders complete their Chair tenure, even if their institution loses Chairs through the reallocation process.

As per the following key finding:

Finding 41: The reallocation of Chairs every two years can be disruptive to universities that lose Chairs and makes longer-term planning more challenging. Recent adjustments to the "Chairs toolbox" has already helped to alleviate some of these problems; further monitoring and subsequent adjustments (as indicated from the monitoring) by the CRCP would be warranted on this issue.

Additional considerations:

- The termination of Chairs is disruptive; some chairholders may perceive it as deceptive, and it carries with it the potential to negatively impact both the career of researchers and the reputation of the Canadian research system. Individual chairholders should not be penalized for the fact that their institution as a whole has been proportionately less successful at obtaining federal research funds.
- Some leeway currently exists in the CRCP budget, as approximately 150 of the 2,000 Chairs are not awarded at any given time.
- The CRCP should also consider an allocation formula that is less susceptible to short-term fluctuations in the grant funding received by institutions, and it should examine other means to minimize changes in Chair allocations caused by irregular variations.
- The CRCP should also consider allocating Chairs to universities based on research output productivity and scientific impact instead of using an allocation method based on financial inputs, which is somewhat circular, and does not favour the search for increased performance and efficiency.

Recommendation 4: Reconsider the allocation formula to progressively increase the proportion of CRCP Chairs in SSH disciplines.

As per the following key findings:

Finding 46: The smaller proportion of CRCP Chairs in the SSH disciplines continues to create dissatisfaction among interested segments of the academic community, particularly researchers in these disciplines (who make up approximately half of all researchers in Canada), as well as institutions whose areas of strength and focus are in these disciplines. Specifically, they find that the program does not adequately meet the need to enhance Canada's research capacity in these areas in line with CRCP objectives.

Finding 47: For certain program objectives, researchers in the SSH (and, in some cases, those in the NSE) report greater effects or benefits of their CRCP Chair—such as more substantial structuring impacts in SSH disciplines with regard to collaborative practices and opportunities for HQP—whereas researchers in the health sciences benefit in particular from unique access to salary support for clinical scientists.

Finding 48: While most evaluation informants agree that there is no perfect system, basing the allocation formula only on granting agency funding at the university level, though somewhat circular, adequately meets the CRCP's strategic and institution-focused objectives.

Additional considerations:

- This is a longstanding issue for the CRCP, and a similar recommendation was made in the fifth-year evaluation (nevertheless, the allocation formula remained unchanged, although the CRC Steering Committee acknowledges the "discomfort of the community" with this formula). Dissatisfaction with the present allocation formula stems largely from the fact that the proportion of CRCP funding allocated to the SSH disciplines is lower than that allocated to other discipline areas relative to the proportion of faculty members in these disciplines in Canadian universities, which has implications in terms of the CRCP meeting the capacity development and strategic planning needs of many universities. It is important to note, however, that most parties have a bias on this issue, depending on whether they, their organization, or the community they represent stand to gain or lose from changes to the formula for allocation by discipline area.
- Given that, in most cases, a significant portion of the award is allocated by universities to support chairholders' salaries and not their direct research costs, the CRCP's key mode of action is primarily to support universities and researchers, rather than to support the operating costs of research. Note that salaries for associate or full professors are quite similar across disciplines. Thus, the argument given by several informants that the present allocation by discipline area is justified by the higher costs of research in the health sciences and the NSE (which is related to the greater proportion of grant funds distributed to these disciplines compared with the SSH) is problematic. Similarly, the Steering Committee, in its response to a similar recommendation that was made in the fifth-year evaluation, stated that this allocation formula was meant to reflect "each discipline's ability to fund research and development" and so was "deemed the most appropriate" to strengthen Canadian research excellence. Prescribing the allocation of Chairs across disciplines based on their respective research costs or inputs (i.e., the "ability to fund research") should therefore be balanced by an understanding that the CRCP supports only a very small fraction of chairholders' research costs.
- Reconsidering the allocation formula in light of the program's mode of action (i.e., supporting researchers' salaries and not direct research costs) would also serve to better meet the needs of large segments of the university community. Increasing the proportion of Chairs in the SSH would also continue to ensure a high level of achievement of program objectives, in particular objectives relating to collaboration and training of HQP.
- Underlying assumptions about the causal link between research costs or funding, research excellence, and the CRCP allocation of Chairs by discipline area should be clarified. Various evaluation informants also suggested that the allocation by discipline area reflected the perceived worth of research conducted across disciplines. At the very least, the justification of the present allocation by discipline area should be made more explicit (e.g., in the program guidelines) so that discussions on this matter could address the relevance and adequacy of the allocation formula based on its intended role as part of the program's design.
- Any change in the allocation by discipline area should be made gradually, so as to minimize the disruption it may cause to current chairholders and universities' staff/resource planning. The phase-out period should be long enough to ensure that chairholders do not lose their Chair because of a change in allocation by discipline area, as well as to allow universities to respond to the shift within the context of their strategic thinking/planning.

- Suggestions to remove the allocations by discipline area at the institutional level (i.e., to allow universities to distribute their Chairs across disciplines as they see fit) would address the concerns of universities but would also create new issues and create additional risks.
  - First, chairholders and non-CRCP faculty are frustrated by the lack of transparency and the immense variability associated with the implementation of the CRCP at the university level. Allowing universities to determine their own internal allocations of Chairs across disciplines would likely exacerbate these issues, with associated risks for the reputation and effectiveness of the program. In fact, the decisions and responsibilities (though not all of the accountability) related to balancing Chair allocations by discipline area would simply be transferred from the CRCP to the institutions.
  - Second, given that the existing Canadian research context at the policy and funding levels is not particularly favourable to SSH disciplines, and considering the vocation of some of the institutions that hold the largest number of Chairs, there is a real chance that some institutions would chose to place a greater proportion of their Chairs in disciplines that would be most profitable in terms of accessing certain resources or programs. If this were to occur, it would be at the detriment of their areas of research strength that are less favourably positioned under the current policy apparatus; additionally, the CRC Secretariat would have no recourse, and the SSH community would not be as well served by the CRCP than they are at the present time.

Recommendation 5: Provide advice and guidance to universities on best practices for CRCP implementation, and establish a formal, accessible, and open mechanism in order to assist chairholders' interactions with the CRCP and/or their universities in cases where there is a perception that the award is not being adequately managed (including during the nomination/renewal process and post-award administration).

As per the following key findings:

Finding 34: A small proportion of chairholders—likely in the order of 10–15%—are not maximizing the potential of their Chair because certain elements that are necessary to the support of their research (e.g., research funding, infrastructure support from various sources) have not come together in a timely or sufficient manner.

Finding 44: In some cases, CRCP chairholders report not having received sufficient support from their university to maximize the success of their research program. Chairholders have limited recourse and support from the CRCP in instances where they perceive that their original agreement and expectations have not been respected.

Finding 45: Variability in the support offered by universities, especially for research and teaching release, has resulted in persistent frustration among chairholders. Expectations also remain similar for chairholders who receive widely different types and amounts of support from their institution.

Finding 52: The measures implemented by the CRCP to monitor equity issues are justified, and they are helping the CRCP to effectively address these issues in its design. Additional efforts by the CRCP and universities would help further reduce or prevent the under-representation of designated groups.

Additional considerations:

- The CRCP does not currently participate in communications or interactions within host institutions and has generally refrained from actively involving itself in the resolution of issues that arise from the university-level implementation of the CRCP. This is somewhat at odds with the fact it has a large stake in the success of individual CRCP chairholders. Indeed, the outcomes of the program are intimately tied to the success of its chairholders, and the CRCP is held accountable for the design and success of the program as a whole.
- This relatively hands-off approach incurs the risk of diminishing the program's success in cases where certain decisions and processes implemented by universities directly or indirectly hinder the achievement of program objectives and specific outcomes (for example, those that lead to the departure of chairholders or inhibit their ability to generate and apply new knowledge or train HQP) or exacerbate real or perceived equity issues. Moreover, seeing the importance of the CRCP brand in terms of the attraction and retention of chairholders, some university-level practices that reduce the perceived value or prestige of a CRCP Chair may have wider-scale effects on the program's effectiveness.
- Through its monitoring role, the CRC Secretariat is often aware of issues occurring within institutions on which it could provide advice, guidance, or tools. There is therefore an opportunity for enhanced oversights and responsiveness of the CRC Secretariat to ensure that universities are implementing the program according to the original intent, and that the guidelines and decisions of the CRCP are being respected. While operational aspects are somewhat outside of the scope of these recommendation, the CRC Secretariat could consider the following ideas when developing the mechanisms through which it could take on a stronger role in this regard:
  - The monitoring role of the CRCP could be augmented to an advisory role, including, but not limited to, the development of standard/acceptable operation practices for universities, which should be publicly available and widely disseminated, as should updates and reminders on program guidelines. One such practice is discussed under Recommendation 6. Many universities have already adapted and improved their CRCP implementation practices, and these successful practices could be shared with other institutions via the CRCP.
  - Chairholders could be provided with an accessible and formal mechanism through which to seek recourse through the CRCP in cases where the university has not resolved the issue. This mechanism would serve to not only better inform chairholders and potential chairholders about the program (and thus manage their expectations), but also to identify and monitor cases where a follow-up with the university would be warranted, such as for practices that go against program objectives, or where there is evidence of repeated issues.
  - Non-compliance by universities with standard/acceptable practices (including in the nomination process, financial management of the award, and other critical aspects of university-level program implementation) could be met with sanctions—such as freezing new nominations until problems are remedied—that are clearly identified and enforced by the CRCP. The program as a whole would benefit if universities were held accountable for their practices.
- These efforts would also directly contribute to and be augmented by more efficient and effective

coordination between the CRCP-supporting organizations (see Recommendation 7).

- These efforts would also be very useful in addressing certain biases and challenges reported by chairholders in designated groups, such as perceived discrimination in the negotiation of conditions with their institution.
- The CRCP should also continue to strive toward transparency in order to help manage the expectations of potential and current chairholders. As such, the CRCP should fully implement the recommendation from the fifth-year evaluation to increase monitoring and public reporting of university support for Chairs (Steering Committee Decision 10).
  - Steering Committee Decision 10: "Increase monitoring of university support for Chairs, including research funding and teaching relief, as well as monitoring of the use of the funds provided through the Chairs program. The Secretariat will make this information publicly available in aggregate form (by tier and discipline) on an annual basis." While the CRC Secretariat does monitor these aspects via the annual reports, the last step (i.e., to publicly share the aggregated information) was not implemented, and it is not clear to what extent the CRC Secretariat is imposing sanctions in the case of discrepancies observed between the nomination files and the actual award fund allocation. Some discrepancies reported by chairholders were related to universities retaining a larger proportion for salaries (see Recommendation 1).

Recommendation 6: Require that universities be more transparent in their Chair selection and renewal processes to both increase the success of chairholders and minimize unintended effects among non-CRCP faculty.

As per the following key findings:

Finding 42: Universities have developed a range of practices to select and support the nominations for Chairs and renewals, but in some cases the lack of transparency in these processes creates resentment and feeds the perception that the institution's decisions are driven by internal politics rather than justified by scientific/strategic criteria. Clear, transparent, and well-supported nomination/renewal practices are beneficial for both the success of chairholders and to minimize unintended impacts among non-CRCP faculty.

Finding 50: Systemic barriers were reported by about 15% of chairholders in designated groups. The nature of these barriers is such that they are inherent to all chair programs and the wider academic environment. However, the selection and nomination process used by universities is a weak point in the CRCP's design in this regard.

Additional considerations:

- Many universities have already implemented transparent selection and renewal processes, with favourable results for chairholders (i.e., for their understanding of the process and of institutional expectations) as well as non-CRCP faculty (i.e., minimizing resentment and criticism). Institutions that do not openly share information on their selection criteria and nomination processes often note more adverse effects, with repercussions for the chairholder and for the reputation of the program.
- Key elements of this process should be transparent to potential nominees, chairholders and other

faculty members, as well as to the CRC Secretariat (e.g., via proper documentation/evidence of the process and information on how decisions are made).

- In keeping with Recommendation 5, the CRC Secretariat should therefore encourage transparency in the selection and renewal processes as a standard practice and could assist in this process by making the program guidelines more explicit with regard to the nomination and renewal criteria for Tier 1 and Tier 2 chairholders.

Recommendation 7: Ensure that all chairholders receive timely and adequate cross-organizational support for their research program.

As per the following key finding:

Finding 34: A small proportion of chairholders—likely in the order of 10–15%—are not maximizing the potential of their Chair because certain elements that are necessary to the support of their research (e.g., research funding, infrastructure support from various sources) have not come together in a timely or sufficient manner.

Additional considerations:

- CRCP chairholders rely on several different sources of support for the success of their research programs; the CRCP, in turn, relies to a large extent on the success of its chairholders to maintain the achievement of program objectives, particularly with regard to impacts on research capacity and HQP training. However, a non-negligible percentage of Chairs across the CRCP have had less success with their research programs than expected because of delays or inadequate support. Such instances include chairholders who are unsuccessful in their applications for research grants (and therefore lack the funds to support their research programs) and chairholders who experience delays in setting up their research facilities due to issues with accessing or utilizing their infrastructure funds.
- The exact proportion of Chairs who experience these challenges could not be ascertained from the available data, because these types of issues were not a focus of the data collection. However, several reports of this nature surfaced across multiple lines of evidence, across disciplines and institutions, and at the program level. The most vulnerable period appears to be during the initial years of the Chair tenure, particularly for nominees recruited from outside of the host university.
- Considering the crucial nature of research and infrastructure funding in the effectiveness of the program's outcomes, the consequences of these instances affect, to a varying extent, the individual chairholders, the host institutions, and the CRCP itself. Of particular concern are cases where such instances contributed to the resignation and departure of chairholders. In the absence of further monitoring of these cases and the development of effective responses to them, a proportion of chairholders will continue to underperform for these reasons.
- The CRCP, the CFI, federal granting agencies, and universities all contribute to delivering various forms of support to chairholders. As each has a stake in the success of the CRCP, they should work together to better understand, monitor, and determine appropriate ways to reduce the frequency of these cases. More specifically, the CRC Secretariat should put in place additional processes with the CFI and the granting agencies to ensure that universities are well prepared to

support their chairholders. Such efforts should include ongoing communication between the organizations, as well as the coordination of shared activities dedicated to monitoring and developing creative solutions (e.g., meetings, workshops, site visits).

APPENDIX A — METHODS

This section describes the overall approach (Section A.1) and provides a summary of the data collection and analytical methods used in the present evaluation (Sections A.2 and A.3). Please note that more detailed documentation of these methods was approved by the Evaluation Advisory Committee during the design and data collection phases of the study.

A.1 Overall Approach and Design

This evaluation used multiple indicators and lines of evidence to address the 11 evaluation questions (Table III): a document/file/literature review (including review and analysis of administrative data), 110 interviews, four web surveys, and four focus groups (see overview in Table IV). Moreover, higher-level analyses made use of the collected data: a bibliometric analysis, 19 case studies, and a study of equity issues. The last phase of the evaluation—meta-analysis and reporting—drew from all of the data collected and analyses performed in the previous phases. The data collection matrix (DCM), presented in Appendix B, cross-links the evaluation issues and questions with indicators, data sources, and methods. Figure 8 illustrates how the methodological instruments and deliverables relate to one another and to the main phases of the evaluation; note that this report is represented in green.

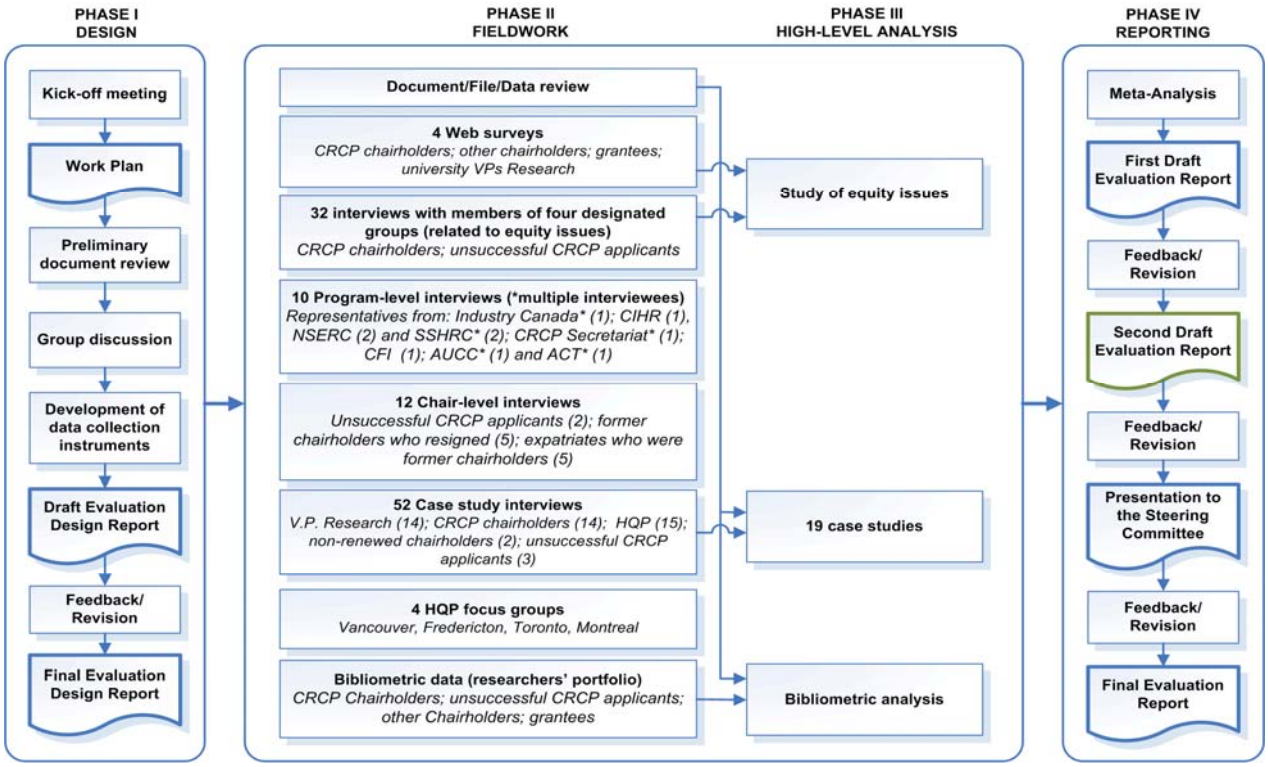

Figure 8 Evaluation approach overview: phases, processes, and deliverables

During the design phase of the evaluation, a discussion group with individuals from the three federal granting agencies, IC, and the CRC Secretariat provided information essential to developing the data collection instruments and to refining the DCM, including perceptions and opinions that helped focus the data collection on priority evaluation issues and questions.

A.2 Data Collection Methods

The data collection instruments for each method were developed during the design phase. This process involved an in-depth review of evaluation questions, indicators, data sources, and collection methods in the DCM. These instruments were developed on the principle that they should be aligned as clearly as possible with indicators in the DCM and that they should be consistent and enable comparisons with data collected as part of previous studies and evaluations.

A.2.1 Document and file review

The review of program documents and information was conducted in two parts: 1) a preliminary review was performed during the design phase to provide the evaluation team with the information needed for designing the study and the data collection instruments, and 2) the full document and program information review was completed during the fieldwork phase, as specified in the DCM.

Documents, literature, files, and program data that were reviewed include:

- CRCP documents, including program guidelines, past evaluations, and report templates;
- documents on CRCP Chairs, including annual and financial reports and exit surveys;
- departmental documents from the CIHR, NSERC, SSHRC, the CFI, and IC;
- governmental documents relating to science and technology (S&T);
- documents on non-CRCP Chairs;
- other documents/literature (e.g., Statistics Canada data), when appropriate; and
- program data extracted from the CRCP's administrative database (CIMS), which contains, among other information, data and contact information for chairholders.

A.2.2 Interviews

A total of 106 interviews were conducted, including 10 program-level key informant interviews (with a total of 21 interviewees), 12 Chair-level interviews, 52 interviews conducted as part of the case studies (Section A.3.2), and 32 equity-related interviews (Section A.3.3). Interview guides were designed to ensure that questions were aligned with the evaluation questions and indicators identified in the DCM.

Program-level interviewees provided primarily qualitative data on the perceptions and opinions of individuals who have had a significant role in the design and delivery of the CRCP or who otherwise had a stake in the program. The 10 program-level key informant interviews were conducted with:

- SSHRC representatives (n = 2, with respectively 1 and 2 interviewees);
- NSERC representatives (n = 2, with 1 interviewee each);
- CIHR representative (n = 1, with 1 interviewee);
- CFI representatives (n=1, with 1 interviewee);
- Industry Canada representatives (n = 1, with 4 interviewees);
- members of the CRC Secretariat (n = 1, with 6 interviewees);
- members of the Canadian Association of University Teachers (n = 1, with 2 interviewees); and
- members of the Association of Universities and Colleges of Canada (n=1, with 2 interviewees).

Chair-level interviewees provided information on the counterfactual analysis and potential limitations of the program, especially the ability of the program to attract and retain leading researchers. The 12 Chair-level interviews were conducted with participants from the following three groups:

- researchers who submitted an unsuccessful application for a CRCP Chair (n = 2);
- researchers who declined or resigned their CRCP Chair (n = 5); and
- expatriates who were former chairholders (n = 5).

A.2.3 Focus groups

Four focus groups with 5 to 10 participants were conducted with highly qualified personnel (HQP, including graduate students, postdoctoral fellows, and research assistants) who have participated in research conducted by CRCP chairholders. During these focus groups, HQP were invited to discuss their experiences and opinions on matters relating to the CRCP. The collected data were used in particular to inform the evaluation question on the training of HQP (Section 3.4). Table XX presents the data on the characteristics of the four focus groups.

Table XX Characteristics of the HQP focus groups

City	Language	Total HQP	Agency (tier)			Affiliation
			CIHR	NSERC	SSHRC	
Fredericton, NB	English	9	1 (T2)	6 (3/T1; 3/T2)	2 (T2)	University of New Brunswick (Fredericton and Saint John)
Montréal, QC	French	10	3 (1/T1; 2/T2)	5 (3/T1; 2/T2)	2 (T1)	École Polytechnique de Montréal; HEC Montréal; Université de Montréal; Université du Québec à Montréal
Toronto, ON	English	5	2 (T2)	2 (T2)	1 (T2)	Ryerson University; University of Toronto
Vancouver, BC	English	10	3 (2/T1; 1/T2)	4 (2/T1; 2/T2)	3 (2/T1; 1/T2)	Simon Fraser University; University of British Columbia

A.2.4 Web surveys

The four web surveys were designed to provide quantitative and qualitative data on the 11 evaluation questions. Web surveys extended the scope of the evaluation by reaching a far wider audience than permitted by interviews alone. The survey questionnaires were cross-linked with the DCM to ensure that data collection via the surveys addressed evaluation questions with regard to relevance, success, efficiency and effectiveness, governance, design, and delivery, and equity of the program for the four designated groups.

The four web surveys were administered to the following groups (sample populations and response rates are presented in Table XXI):

- **CRCP chairholders**: researchers who currently hold a CRCP Chair;
- **Other chairholders**: researchers who received a chair or a career award from instances other than the federal granting agencies (e.g., excludes IRCs);
- **Grantees**: researchers who have never received a CRCP Chair or another kind of chair or career award but who are otherwise comparable to CRCP chairholders (i.e., having received substantial amounts of research grants from the three councils); and
- **VPs Research**: university Vice-Presidents Research or equivalent title from Canadian universities.

Table XXI Response rates for four web surveys

Web survey	Initial sample	Valid sample	Completed and partials	Valid response rate†	Margin of error‡
CRCP chairholders	1,811	1,809	1,009	55.8%	2.1%
Other chairholders	600	591	173	29.3%	6.3%
Grantees	600	593	172	29.0%	6.3%
University VPs Research	73	73	44	60.3%	9.4%

Notes: † Valid response rate = Number of completed surveys, divided by the valid sample, which excludes unreachable potential respondents.
‡ 95% confidence level (19 times out of 20).

A.3 High-Level Analysis

High-level analyses were conducted based on data collected during the previous phase. These analyses consisted of a bibliometric study, 19 case studies, and a study of equity issues.

A.3.1 Case studies

The case study approach was used to increase the evaluators' understanding of the essential conditions for long-term success and to shed light on the program's relevance. Nineteen mini-case studies—focusing on 14 CRCP Chairs, 2 non-renewed Chairs, and 3 non-awarded Chair applications—were studied and analysed to examine how variables such as discipline, university size, support from the CFI, the type of Chair (i.e., Tier 1 or 2), and the main research discipline (which corresponds to the broad division between the three research agencies) may have influenced the accomplishments of the chairholders. The case studies were used to examine and illustrate whether the design and delivery of the program is adequate in light of these variables.

A multi-criteria selection process was used to provide an appropriate sample of CRCP Chairs; this included performance criteria collected in the annual reports that might indicate differences in the capacity of the chairholder to meet the objectives of the program in terms of success (number and quality of research output, number of collaborations, and HQP training). Data collection for the case studies consisted of a document and file review, and 52 interviews with chairholders/researchers, VPs Research (or equivalent senior administrator) and, when relevant, with one of the chairholder's HQP.

The breakdown of the 19 case studies across chosen variables is shown in Figure 9. Note that, as discussed in the limitations (Section 1.6), these cases include fewer chairholders who had not received CRCP-associated CFI support than originally planned.

Domain	Variables	Group A chairs			Group B chairs			Chair not awarded (3)	Chair not renewed (3)
Natural sciences and engineering (NSERC)	University size	G13	Non G13		G13	Non G13		Non G13	Non G13
	CFI support	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*N/A*	*Yes*
	Tier	T1	T1	sp. T2	T1	T1	sp. T2	T1	T1
Health sciences research (CIHR)	University size	G13			G13			G13	G13
	CFI support	*Yes*	*Yes*		*No*	*Yes*		*N/A*	*Yes*
	Tier	T1	T2		T1	T2		T1	T1
Social sciences and humanities (SSHRC)	University size	G13	Non G13		G13	Non G13		G13	
	CFI support	*No*	*Yes*		*Yes*	*Yes*		*N/A*	
	Tier	T2	T1		T2	T1		T2	

Figure 9 Distribution of the 19 case studies

A.3.2 Bibliometric analysis

The bibliometric analysis focused principally on the measurement of the success of CRCP chairholders nationally, internationally, and in comparison with other type of researchers. The CRCP funds two groups of researchers based on their career status, namely established researchers who lead in their field (Tier 1 Chairs) and emerging researchers that have the potential to lead in their field (Tier 2 Chairs). Therefore, the analysis provided data to address the following questions for each group of scholars:

1. Are CRCP chairholders more productive, on average, than researchers from comparable groups in terms of their number of published journal articles?
2. Are the research outputs produced by CRCP chairholders of high impact relative to the average output, published in peer-reviewed journals, of comparable groups?
3. Are CRCP chairholders collaborating more often (nationally and internationally), on average, than researchers from comparable groups?
4. Has CRCP funding contributed to increasing the scientific performance of supported researchers in terms of their number of published journal articles?
5. Has CRCP funding contributed to increasing the scientific performance of supported researchers in terms of the scientific impact of their journal articles?
6. Has CRCP funding contributed to increasing the collaboration rate (national and international) of supported researchers?

Questions #1, #2, and #3 assessed the scientific performance of CRCP chairholders relative to those of comparable groups of researchers: unsuccessful CRCP applicants (which are used as the control group), researchers who obtained a Chair or career award from sources other than the granting agencies, and researchers at similar career stages without a CRCP Chair (also, ideally, without any other kind of Chair). Questions #4, #5, and #6 assessed the effect of the program on the scientific performance of CRCP chairholders through a comparison of their scientific output produced prior to and after receiving their Chairs.

Publication portfolios and bibliometric indicators were produced using the Scopus database (Elsevier). The indicators used to answer these questions are the number of papers produced by each researcher; the Average of Relative Citations (ARC), which is an indicator of scientific impact; and the Average of

Relative Impact Factors (ARIF), which is a proxy for the quality of scientific publications and the collaboration rate. The study samples are as follows:

- **CRCP chairholders (n=492)**: Researchers who received a CRCP Chair; the selection was performed randomly using the CIMS dataset provided by the CRC Secretariat (July 2009). For some analysis specific to disciplines, the number of chairholders from SSHRC was doubled and added to the pool.
- **Other chairholders (n=163)**: Researchers who received a chair or a career award from instances other than the federal granting agencies (e.g., excludes IRCs); these were identified via a web scan of comparable programs. Other chairholders were matched with CRCP chairholders (e.g., based on discipline area and career status).
- **Grantees (n=202)**: Researchers who have never received a CRCP Chair or another kind of chair or career award but who are otherwise comparable to CRCP chairholders (i.e., having received substantial amounts of research grants from the three councils); the lists of eligible grantees were provided by the three funding agencies. Grantees were matched with CRCP chairholders (e.g., based on discipline area and institution size).
- **Unsuccessful CRCP applicants (n=205)**: Researchers who applied for a CRCP Chair but were not awarded a Chair. All of the unsuccessful applicants to the program were included in the analysis.

Note that the sample population of other chairholders and grantees examined as part of the bibliometric analysis do not necessarily comprise the same individuals from these groups who answered the web surveys, and vice versa.

A.3.3 Study of equity issues

This study of equity issues reviewed systemic barriers to acquisition and retention of Canada Research Chairs in the four federally designated employment equity groups: women, members of visible minorities, persons with disabilities, and Aboriginal people. A total of 32 qualitative interviews were conducted with members of these four designated groups, including CRCP chairholders and unsuccessful CRCP Chair applicants. Other interviews and web surveys also included questions to collect data regarding the equity issue.

This study examined gender and equity issues from the perspectives of those potentially affected, including CRCP chairholders and other program stakeholder and comparison groups. This study focused on: a) the presence, absence, and impacts of systemic biases and barriers, and their intersections, that may have influenced designated-group scholars' capacity to access and succeed in the CRCP; b) the extent to which any biases and barriers are concentrated in the program or mirror biases and barriers present or pervasive in all federal granting programs; and c) how the CRCP has and could work to attenuate or redress issues of equity and inequity in its design and delivery.

APPENDIX B — DATA COLLECTION MATRIX (DCM)

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
Continued need and relevance												
1.0 Is there a continued need for the CRCP?												
1.1 To what extent has the context in which the program operates changed since its inception? Changed since 2005?	1.1.1 Description of the operating context of the program at different times	▪ Governmental/departmental documents ▪ Program-level interviews ▪ Survey populations (VP)	●	●						●		
	1.1.2 Informed opinions on the continued relevance of the objectives in the current context—analysed under question 1.2	▪ Program-level interviews ▪ General-level interviews ▪ Survey populations (VP)		●	●					●		
1.2 Do the objectives of the program continue to be relevant given the changes in the program's context?	1.2.1 Informed opinions on the responsiveness of the program to meet the needs of stakeholders (federal granting agencies, IC, universities, government, and Canadians in generally)	▪ Program-level interviews ▪ General-level interviews ▪ Case study interviews (VP) ▪ Survey populations (VP)		●	●	●				●		
1.3 To what extent are there recent complementary or competing programs that are meeting similar needs for which the CRCP was designed to address?	1.3.1 Informed opinions on the extent to which the CRCP overlaps with or duplicates other similar programs, if at all	▪ Review of other chair and similar programs at the national and international levels (on a best effort basis) ▪ Program-level interviews ▪ Survey populations (VP)	●	●						●		

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
2.0 With respect to the overall objectives of the CRCP, does there remain a role for the federal government to play? What is the nature of this role?	2.0.1 Evidence that CRCP objectives are consistent with government plans and priorities	▪ Governmental/departmental documents ▪ Program-level interviews	●	●								
Success of the CRCP												
3.0 To what extent have retention and attraction of leading/excellent researchers taken place?												
3.1 What are the barriers to attraction? Retention?	3.1.1 Comparison of the proportion of CRCP Chairs awarded to candidates within or outside of Canada	▪ Program data (CIMS) ▪ Survey populations (CH, other chairholders [OCH], grantees [G])	●				●	●	●			
	3.1.2 Informed opinions on factors limiting the attraction and/or retention of leading researchers	▪ General-level interviewees ▪ Survey populations (VP, CH, OCH, G)			●		●	●	●	●		
	3.1.3 Reasons why chairholders resigned or declined their CRCP Chair	▪ CRCP Chair documents (exit forms) ▪ General-level interviewees	●		●							
	3.1.4 Turnover of CRCP chairholders	▪ Program data (CIMS)	●									
3.2 How has the CRCP contributed to or alleviated barriers to attraction and retention?	3.2.1 Informed opinions on the contribution, if any, of the CRCP to alleviating identified barriers to attraction and retention	▪ General-level interviewees ▪ Case study interviewees (VP, CH) ▪ Survey populations (VP, CH, OCH, grantees)			●	●	●	●	●	●		

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
3.3 How has the CFI component contributed to attraction and retention?	3.3.1 Informed opinions on the importance of the CFI component in researchers' decisions to remain in or move to Canada	▪ General-level interviewees ▪ Program-level interviews ▪ Case study interviewees (VP, CH) ▪ Survey populations (VP, CH, OCH)		●	●	●	●	●		●		
4.0 What has been the CRCP's contribution to the capacity of universities to produce and apply new knowledge?	4.0.1 Informed opinions and comparison of opinions on the quality, importance, application, and impact of new knowledge generated by CRCP chairholders and other chairholders	▪ CRCP documents ▪ Case study interviewees (VP, CH, HQP) ▪ Survey populations (VP, CH, OCH, G)	●			●	●	●	●	●		
	4.0.2 Comparison of the research output and scientific impact of CRCP chairholders, other chairholders, grantees, and unsuccessful CRCP applicants	▪ Scopus database (Elsevier) ▪ Survey populations (CH, OCH, G, VP)					●	●	●	●		●
	4.0.3 Comparison of the research output and scientific impact of CRCP chairholders before and while supported	▪ Scopus database (Elsevier)										●
	4.0.4 Comparison of opinions on the funding leveraged by CRCP chairholders, other chairholders, and grantees	▪ Program-level interviews ▪ Case study interviewees (CH) ▪ Survey populations (CH, OCH, G)		●		●	●	●	●	●		
	4.0.5 Success rate in other federal granting agency competitions	▪ Tri-Council data ▪ Survey populations (VP, CH, OCH, G)	●				●	●	●			
	4.0.6 Comparison of research dissemination by CRCP chairholders, other chairholders, and grantees	▪ Survey populations (CH, OCH, G)					●	●	●			

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
4.1 How has the CFI component contributed to the universities' capacity to produce and apply new knowledge?	4.1.1 Description of the infrastructure funded by the CFI to CRCP chairholder teams	▪ CFI data ▪ Case study interviewees (VP, CH) ▪ Survey populations (CH, OCH, G)	●			●	●	●	●			
	4.1.2 Contribution of the CFI component to research capacity; informed opinions of CRCP and VP research	▪ Case study interviewees (VP, CH, HQP) ▪ Survey populations (VP, CH, G)		●		●	●			●		
5.0 To what extent has the CRCP contributed to universities developing a comparative advantage in strategic areas of research?	5.0.1 Informed opinions and comparison of the number of established or expanded research centres in areas related to the university's SRP	▪ Case study interviewees (VP, CH) ▪ Survey populations (CH, OCH, G)				●	●	●	●	●		
	5.0.2 Informants' knowledge and comparison of the clusters of CRCP Chairs, other chairs, and grantees in areas of strategic importance	▪ Case study interviewees (VP, CH) ▪ Survey populations (VP, CH, OCH, G)				●	●	●	●	●		
	5.0.3 Informed opinions on the development of comparative advantages for universities due to the CRCP in the following areas: - Infrastructure improvements - Increased proportion of external funding for strategic research areas - Increased number of faculty/researchers in strategic areas - Increased number of graduate students in strategic areas	▪ Annual University reports(on a best effort basis) ▪ Case study interviewees (VP) ▪ Survey populations (VP, CH, OCH, G)	●			●	●	●	●	●		

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
	5.0.4 Informed opinions on the alignment of the objectives pursued by the CRCP with the strategic research orientations of universities	▪ Program-level interviews ▪ Case study interviewees (VP) ▪ Survey populations (VP)		●		●				●		
	5.0.5 Informed opinions and comparison of the level of internal and external scientific collaboration (within Canada) of CRCP chairholders relative to other chairholders, grantees, and unsuccessful CRCP applicants	▪ Scopus database (Elsevier) ▪ Survey populations (VP, CH, OCH, G)					●	●	●	●		●
	5.0.6 Comparison of the level of internal and external scientific collaboration (within Canada) of CRCP chairholders before and during support	▪ Scopus database (Elsevier)										●
	5.0.7 Informed opinions and comparison of the level of international scientific collaboration of CRCP chairholders relative to other chairholders, grantees, and unsuccessful CRCP applicants	▪ Scopus database (Elsevier) ▪ Survey populations (VP, CH, OCH, G)					●	●	●	●		●
	5.0.8 Comparison of the level of international scientific collaboration of CRCP chairholders before and during support	▪ Scopus database (Elsevier)										●
	5.0.9 Informed opinions on the CRCP's contribution to Canada's international reputation	▪ Program-level interviews ▪ Survey populations (VP, CH, OCH, G)		●			●	●	●	●		

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
5.1 How has the requirement to develop strategic research plans (SRPs) assisted universities to develop a comparative advantage?	5.1.1 Informed opinions on the extent of the SRPs' assistance to universities for: - Infrastructure improvements - Increased proportion of external funding for strategic research areas - Increased number of faculty/researchers in strategic areas - Increased number of HQP in strategic areas	▪ Case study interviewees (VP) ▪ Survey populations (VP)		●		●				●		
6.0 What has been the CRCP's contribution to the training of highly qualified personnel (HQP)?	6.0.1 Data on the average number of students by type of degree who graduated under the direct supervision of chairholders	▪ Survey populations (CH, OCH)					●	●	●			
	6.0.2 Comparison of the number of students supervised by CRCP chairholders, other chairholders, and grantees	▪ Survey populations (CH, OCH, G)					●	●	●			
	6.0.3 Data on the teaching load of CRCP chairholders relative to average departmental teaching loads	▪ Survey populations (CH, OCH, G) ▪ HQP focus groups					●	●	●		●	
	6.0.4 Comparison of the teaching loads of chairholders relative to those without a CRCP Chair	▪ Survey populations (CH, OCH, G) ▪ HQP focus groups					●	●	●		●	

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
6.1 Has the CRCP contributed to universities' capacity to attract and retain the highest-quality students from Canada and the world?	6.1.1 Informed opinions on the contribution of CRCP to attracting and retaining high-quality HQP	▪ Case study interviewees (CH, HQP) ▪ Survey populations (CH, OCH, G) ▪ HQP focus groups				●	●	●	●		●	
	6.1.2 Informed opinions on the opportunities to collaborate with other leading Canadian and international researchers available to CRCP trainees; in comparison with other HQP	▪ Case study interviewees (HQP) ▪ Survey populations (CH, OCH, G) ▪ HQP focus groups (HQP)				●	●	●	●		●	
	6.1.3 Informed opinions on the opportunities for CRCP trainees to write proposals and/or papers; in comparison with other HQP	▪ Case study interviewees (HQP) ▪ Survey populations (CH, OCH, G) ▪ HQP focus groups				●	●	●	●		●	
	6.1.4 Informed opinions on the opportunities for trainees to present their findings at conferences; in comparison with other HQP	▪ Case study interviewees (HQP) ▪ Survey populations (CH, OCH, G) ▪ HQP focus groups				●	●	●	●		●	
6.2 How has the CFI component contributed to the capacity to train HQP in collaboration with the CRCP?	6.2.1 Informed opinions of CRCP chairholders on the impact of infrastructure accessibility on the quality of training	▪ Case study interviewees (CH, HQP) ▪ Survey populations (CH) ▪ HQP focus groups				●	●				●	
7.0 Has the CRCP contributed to any unintended effects (either negative or positive)?	7.0.1 Description of unintended effects, positive or negative 7.0.2 Description of the impact of unintended effects	▪ Program-level interviews ▪ Case study interviewees (VP, CH, HQP) ▪ Survey populations (VP, CH, OCH, G) ▪ HQP focus groups		●	●	●	●	●	●	●	●	

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
Efficiency and effectiveness												
8.0 How could the CRCP be made more efficient while maintaining or increasing its level of effectiveness?	8.0.1 Suggestions on how to improve the efficiency of the CRCP	▪ Program-level interviews ▪ Survey populations (VP)		●						●		
	8.0.2 Identification of potential improvements to the current CRCP (e.g., application process, review process, etc.)	▪ Program-level interviews ▪ Survey populations (VP)		●	●	●				●	●	
8.1 Are there alternatives that would be more efficient, and would achieve the CRCP objectives?	8.1.1 Identification of alternate delivery models and associated advantages and disadvantages 8.1.2 Effects and costs of alternative models identified	▪ Program-level interviews		●								
Governance, design, and delivery												
9.0 What are the impacts of program design elements on CRCP effectiveness?	9.0.1 Summative analysis of the findings related to program design obtained for success-related issues	▪ Based on primary and secondary data obtained for success-related issues (Questions 3.0 to 7.0)	●	●	●	●	●	●	●	●	●	●
	9.0.2 Informed opinions on program design: - Tier system - Duration of award - Allocation process - Award amounts - Renewal process - Recruitment process - University funds administration	▪ Program-level interviews ▪ General-level interviewees ▪ Case study interviewees (VP, CH) ▪ Survey populations (VP, CH, OCH, G)		●	●	●	●	●	●	●		

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
9.1 To what extent have university practices implementing the CRCP impacted the program's effectiveness (e.g., hiring practices, nominating procedures, renewal decisions, university support, use of funds)?	9.1.1 Summative analysis of the findings related to program implementation practices within universities obtained for success-related issues	▪ Based on primary and secondary data obtained for success-related issues (Questions 3.0 to 7.0).	●	●	●	●	●	●	●	●	●	●
	9.1.2 Informed opinions on program implementation practices within universities: - Nomination process - Renewal process - Salary support - Variability in support provided by universities - Recruitment process	▪ Program-level interviews ▪ Case study interviewees (VP, CH) ▪ Survey populations (VP, CH, OCH, G)	●	●	●	●	●	●	●	●		
10.0 What are the effects of the Chair allocation formula?												
10.1 Is the balance of Chairs by discipline adequate?	10.1.1 Informed opinions on the suitability of Chair distribution per discipline vis-à-vis the objectives of the program 10.1.2 Analysis of the distribution of CRCP Chairs per discipline	▪ Program documents/data ▪ Program-level interviews ▪ Survey populations (VP)	●	●						●		

Evaluation issue/question	Indicators	Data source	Document and file review	Program-level interviews	General-level interviews	Case study interviews	Survey of chairholders	Survey of other chairholders	Survey of grantees	Survey of VP Research	HQP focus groups	Bibliometric analysis
10.2 Is the formula based only on granting agency funding adequate?	10.2.1 Informed opinions on the suitability of Chair distribution per institution vis-à-vis the objectives of the program 10.2.2 Analysis of the distribution of CRCP Chairs (per institution)	▪ Program documents/data ▪ Program-level interviews ▪ Survey populations (VP)	●	●						●		
10.3 What are the effects of the "Special Chairs" allocation? Is there a need to continue to allocate them? How should they be allocated?	10.3.1 Data on the number of special CRCP Chairs by discipline and university 10.3.2 Informed opinions on the suitability of the distribution of Special Chairs vis-à-vis the objectives of the program 10.3.3 Identification of alternate Special Chair allocation methods	▪ Program documents/data ▪ Program-level interviews ▪ Survey populations (VP)	●	●						●		
Systemic barriers												
11.0 Are there any systemic barriers in accessing the program by members of the four designated groups (women, members of visible minorities, persons with disabilities, and Aboriginal people)?	11.0.1 Presence/absence and systemic barriers and their intersections in CRCP Chair nomination, review, or retention 11.0.2 Impacts of barriers that may have influenced the designated-group scholars' capacity to access and succeed in the CRCP 11.0.3 Extent to which barriers are concentrated in the CRCP or mirror any that are present or pervasive in all federal granting programs 11.0.4 Effectiveness of CRCP action to attenuate or redress issues of equity and inequity in its design and delivery	▪ Program-level interviews ▪ Case study interviewees (VP) ▪ Survey populations (VP, CH, OCH, G) ▪ Qualitative interviews with applicants in the four designated groups, identified or unidentified		●	●	●	●	●	●	●		