

Strategic Research, Innovation and Commercialization Plan 2014 – 2019



**Strategic Research, Innovation,
and Commercialization Plan
2014 – 2019**

**Cape Breton University
Sydney, Nova Scotia, Canada**

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

Table of Contents

1.0	Background and Major Objectives	3
1.1	Vision	4
2.0	Current Research Culture	5
2.1	Research Funding.....	5
2.2	Knowledge Creation, Mobilization and Translation.....	5
2.3	Students	6
2.3.1	Undergraduate Student Research Engagement	6
2.3.2	Graduate Student Research Engagement	6
2.4	Community Research	6
2.5	Institutional Support Network.....	7
3.0	Established and Emerging Research Concepts and Foci	7
4.0	Support for research engagement in foundational research.....	7
5.0	Discipline specific research considerations.....	8
5.1	Arts, Humanities and Social Sciences.....	8
5.2	Business.....	9
5.3	Professional Studies	9
5.4	Science, Engineering and Technology	9
5.5	Unama’ki College	9
6.0	Innovation and Commercialization.....	9
6.1	Partnering with Private Sector.....	9
6.2	Commercialization of Research	10
7.0	Targets and Goals	10
8.0	Measures of Success.....	11
9.0	Future Strategic Research Plans	12

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

1.0 Background and Major Objectives

Cape Breton University was established in the mid-1970s and is a relatively young educational institution. The local community was instrumental in the origin of the institution and still has a significant impact on its programming and research interests. Many researchers are influenced by the local environment, geography, history and culture. Over the last decade, CBU has allocated significant resources to developing and expanding its research culture. CBU is a thriving educational institution with a broad and innovative array of degree, diploma and certificate programs, primarily at the undergraduate level and has gained a strong reputation for the engagement of undergraduate students in research. Many undergraduate students receive an experience similar to graduate students at other institutions, making our undergraduates highly sought after by other institutions for graduate studies. Our students have successfully competed for Canada Graduate Scholarships, and SSHRC and NSERC postgraduate scholarships.

Currently, at the graduate level, CBU offers an MBA in Community Economic Development and, in co-operation with Memorial University, an MEd in Information Technology. Proposals are currently under consideration for graduate programming in Heritage Management, Social Justice, Sustainability in Environment and Energy, Education for Sustainability Creativity and Innovation, Public Administration, Tourism and Emergency Management. Over the next five years a significant emphasis will be placed on developing graduate programs with the research areas outlined in this plan being key components of that development. However, it is important to realize that CBU does not have the resources to all of the programs at the same time. Decisions will have to be made about the merits and viability of each within the fiscal realities that CBU faces. The main thrust of this strategic research, innovation, and commercialization plan is to continue to develop a culture of research and scholarship and to establish priorities for the next five years, building on our current research strengths and expanding into developing areas. This will require partnering with local, regional and national industrial and private sectors in addition to the traditional government funding agencies.

In existence for a little over 30 years, CBU is now undergoing a transformation. Many areas are developing research cultures and programs at the same time. To be a strong and vibrant university, CBU encourages and supports research in all avenues of its programs from arts and social sciences to natural sciences to health sciences to professional programs. It is important to state that the research concepts and foci identified in this document are only a subset of the full research activities within CBU and that to the best of its abilities CBU will encourage and support research in all areas pursued by its faculty. CBU also fully supports the academic freedom of its researchers. It is hoped that the areas identified here will generate synergy among researchers in a variety of disciplines rather than force any particular researcher into a specific area of research. The research themes identified in this document are only those that have been recognized as areas of strength and for which CBU has a national or international reputation. These areas will be the flagship themes helping expand and develop all research areas, and will attract special university support and sponsorship.

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

It is also recognized that by its very nature, research is constantly evolving. What is cutting edge today may be obsolete in a few short years. What will be the hot topics of research in a year or two may not even be in the picture now. Thus, it is necessary for a strategic plan to allow for flexibility and to encourage emerging fields within broader areas which are expected to remain central to CBU's mission. It is also important that strategic research plans be reviewed, updated and refreshed in a timely manner. While a formal plan may only be updated every five years, it is an ongoing commitment and a dynamic rather than static action plan.

The Research and Academic Institutes Policy Committee of Academic Council developed CBU's first strategic research plan for the Canada Foundation for Innovation and Canada Research Chairs Secretariat in 2000. Subsequent to that plan, there was a President's Task Force on Research (2007) and a strategic research objectives and recommendations document developed by the Research Committee of Senate in 2010. In June 2011, Senate adopted an updated strategic research plan for the Canada Foundation for Innovation and Canada Research Chairs Secretariat. At that time, Senate recognized that this was only a subset of the full research agenda of the institution and asked the Research Committee to develop a full strategic research plan. In addition, the Office of Research & Graduate Studies has produced the inaugural annual research report in 2013 providing the foundation for key performance indicators and will be produced annually to help determine the state of research at CBU.

1.1 VISION

Our vision is to be an outstanding undergraduate institution, with a growing portfolio of graduate programs, engaged in research and scholarly activity that has an impact locally as well as globally. As such, CBU is committed to:

- Supporting undergraduate success through research opportunities;
- Supporting graduate student research* through appropriate graduate level programs as well as partnerships with other universities;
- World-class research that is of importance locally, regionally, nationally and internationally;
- Knowledge mobilization and transfer through all modes of dissemination including publication, conference presentation, community and industry engagement, and commercialization;
- Recruiting and retaining faculty who are committed to undergraduate teaching and who will undertake active research programs;
- Promote connections and opportunities between high quality teaching and research.

* Graduate student research opportunities will not be at the expense of undergraduate opportunities. Being a primarily undergraduate institution, CBU's first priority is to ensure the highest quality undergraduate experience.

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

2.0 Current Research Culture

The past decade has seen a significant change in research engagement and productivity. Since 2000, there has been a concerted effort to not only increase the quantity but also the quality of research activities (see 2013 Annual Research Report and below). Over this period, CBU has gained a reputation for exceptional engagement of undergraduate students in research. These students are given opportunities and experiences that rival graduate experiences at many institutions. CBU is committed to building a vibrant research culture, based on the principles of academic freedom, accountability, and ethics, that is held to the highest standards of integrity.

2.1 RESEARCH FUNDING

Today, from quantity and quality perspectives, CBU's research record is impressive, especially for a primarily undergraduate institution. CBU ranked* 54th among the 91 Canadian post-secondary institutions in total research funds received and 36th in total research funds per full-time faculty member. With respect to the 19 primarily undergraduate universities, CBU ranked 7th in funding per full-time faculty member. CBU researchers have attracted more than \$10 million in external funding since 2004.

The research funding per faculty member was at a low in 2009-2011, but has been rebounding over the last few years. In 2011-2013, research funding averaged more than \$2.7 million per year. Over the last 3 years, CBU has seen a significant increase in Canada Foundation for Innovation and Nova Scotia Research and Innovation Trust funded infrastructure projects. In addition, the business and industry sponsored research has increased from nil to approximately ½ million dollars annually. This is due in part to the Canada Foundation for Innovation, and Nova Scotia Research and Innovation Trust infrastructure projects but also due to increased faculty engagement with industry and activity in the Verschuren Centre. It is expected that this will dramatically increase in the next two to five years. CBU does not have a large portion of faculty who have been successful in entrepreneurship, however, there have been a small number of highly successful initiatives. Examples are the Tompkins Institute and Health Outcomes Worldwide, resulting in more than \$54 million in sales, \$17 million in wages and 750 full time employment opportunities.

2.2 KNOWLEDGE CREATION, MOBILIZATION AND TRANSLATION

The 2013 CBU Research Report highlighted the activities around knowledge creation, mobilization and translation. CBU faculty are very active with more than 95 academic publications and 14 books published in 2012 – 13. In addition there were in excess of 230 conference presentations. CBU faculty were also actively engaged in disseminating their research through community events and the media (print, radio and television). There are also many active collaborations internal to CBU, with the local community, industry,

* Data from the *CAUT Almanac of Post-Secondary Education 2011-2012*. All values are for the 2009 fiscal year.

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

nongovernmental organizations and government agencies. Within the comparison group identified in the annual research report, CBU ranked 7th out of 10 in academic publications/per faculty member between 2010 and 2013.

2.3 STUDENTS

2.3.1 Undergraduate Student Research Engagement

CBU prides itself and has gained an excellent reputation for engagement of undergraduate students in research. In many disciplines our undergraduate students receive a research experience that rivals graduate level programs. While this naturally varies according to discipline and some disciplines lend themselves more to the involvement of undergraduates than others, CBU has made it a priority to encourage the involvement of undergraduates in research activities. These undergraduates are active members of the research teams and make a real and lasting contribution to the research being involved in all aspects of the research from developing the research questions, to active research and dissemination of the research results. Undergraduates are given the opportunity to carry out independent research and present their findings at institutional, regional, national and international symposia. Additionally, they work with faculty on industry projects where their research directly impacts the productivity and prosperity of local, regional and national organizations. During the fiscal year ending March 2013, more than 130 undergraduate students were active members of research teams at CBU. CBU is committed to remain true to its roots and keep participation of undergraduates as an essential component of its research agenda.

2.3.2 Graduate Student Research Engagement

Currently, CBU offers an MBA in Community Economic Development and, through a partnership with Memorial University, an MEd in Information Technology. Both of these programs have research components and have students and faculty actively engaged in cutting edge research. In addition, more than twenty CBU faculty hold adjunct appointments with various universities across Canada (from Memorial University to the University of British Columbia) and around the world. These appointments give faculty the capacity to supervise graduate students even in disciplines that do not have graduate degrees. Despite a limited array of graduate programming, in 2012-13 there were more than 65 graduate students actively carrying out research in many disciplines across the CBU campus.

2.4 COMMUNITY RESEARCH

Connection with community and engagement with research that is locally relevant but also of the highest academic standards is a cornerstone of many research centres & institutes as well as individual researchers. Action research has been practiced at CBU for many decades and has been key in the transition of the institution from a junior college to a vibrant active university.

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

2.5 INSTITUTIONAL SUPPORT NETWORK

A major objective of the CBU Strategic Research, Innovation and Commercialization Plan for 2014 – 2019 is to develop a framework to expand research and innovation. To meet this objective, several simultaneous tactics are being pursued. For example: financial and human resources are being allocated to increase involvement in research and innovation; the institution is strengthening its efforts to obtain outside funding for research; industrial and community research partnerships are being enhanced; continuous improvements are being made to research facilities; and procedures are being developed to involve students more extensively in research projects. CBU has a very progressive system of internal research grants that can be used to supplement start-up grants and external funding, and serve as seed funding to develop projects for external funding. There is a system of teaching release for research and an evergreen computer lease program that provides faculty and researchers access to computer equipment that is refreshed on a three or four year cycle.

3.0 Established and Emerging Research Concepts and Foci

The identification of research concepts and foci should in no way interfere with a faculty member's ability to choose what to study. The aim of a concept designation is to identify areas of strength and emerging capacity and to identify areas that are likely to have significant activity in the near future thereby warranting a research chair and/or major research infrastructure.

The 2011 CRC/CFI strategic research plan recognizes current and or emerging expertise in four interconnected research concepts: Cultural and Ecological Heritage, Fundamental Knowledge and Innovation, Social and Political Processes and Change, and Sustainability and Community Development. Building on these, and the changes in the research culture and expertise over the past couple of years, the primary research concepts can be grouped according to:

- 1) Culture and Creativity
- 2) Social and Ecological Change and Adaptation
- 3) Community Economic Development
- 4) Fundamental Knowledge Creation

Each of these general concepts is multidisciplinary and presents areas of established and emerging strength. They are not independent, many research programs and researchers can identify with more than one theme and there is interconnectivity between them.

4.0 Support for research engagement in foundational research

It is of the utmost importance that even though a university needs to identify areas of focus for research strengths, that any university that wants to develop a world class research culture and scholarly engagement must also support areas of research that are outside the strategic areas. It is this broad engagement of researchers in many disciplines that is a core value

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

of a successful university and ultimately establishes a strong research culture. Not everyone is expected to fit within the strategic areas, and in fact it would be short-sighted and undermine the long term stability and productivity of a university to have everyone focus in relatively few areas of inquiry. Academic freedom to pursue what and how research is conducted, is a fundamental principle to building a strong research culture. While a strategic plan will naturally focus time and resources on the priorities identified within the plan, it is important not to neglect the broader research community.

5.0 Discipline specific research considerations

During the fall of 2013, the Working Group (section 10.1) carried out consultations with the Academic Schools and Unama'ki College. The Dean of Research & Graduate Studies attended all consultations and in many cases was accompanied by at least one other member of the Working Group. It was very clear during the consultations that there is a general desire amongst faculty to increase the research activity and that it is key to our success as an institution. Faculty are very keen to ramp up research, however there was an expression of not having the supports or tools necessary to do so. While each discipline has unique considerations, there are many similarities in what is viewed as our strengths as well as areas that we need to improve. In one way or another, all have identified our **engagement of undergraduates in research** as probably our strongest attribute. All have also recognized the tremendous opportunities presented by the VC and the role it will play in the coming decade. There is an interest in becoming involved in projects connected to the VC.

There have been also some common areas identified that need improvement:

- 1) Lack of time to do research was a common thread through the consultations. The issues discussed ranged from secretarial and administrative support to course relief to teaching schedules to workflow issues related to developing and managing large scale projects to the submission of replicate information to various administrative offices.
- 2) Lack of access to graduate students.
- 3) Not knowing what others are doing or their interests/expertise.
- 4) Not understanding the role of commercialization in research.
- 5) Need for operational funding for research centres & institutes.

However there are also unique needs and challenges in each discipline. In this section, some of the unique features that were identified during the consultations with the academic schools and Unama'ki College are presented.

5.1 ARTS, HUMANITIES AND SOCIAL SCIENCES

There is need for help with non tri-agency funding, grant proposals and help with disseminating research findings. The lack of online journals in some research areas is a limiting factor. There is a need for more supports for international projects.

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

5.2 BUSINESS

Lack of discipline specific research tools and library resources were major concerns. There is a need to formalize mentoring and partnership with other universities. Lack of dedicated space for research assistants and graduate students is a concern.

5.3 PROFESSIONAL STUDIES

There is a need for increased professional development funding and support for project management. Strong community relations and partnerships are key to professional studies activities.

5.4 SCIENCE, ENGINEERING AND TECHNOLOGY

There is a need for equipment repair and maintenance. There is a real need for a capital budget to ensure that facilities are up to date and enabling faculty to compete for funding. There is a need to partner better with industry.

5.5 UNAMA'KI COLLEGE

There is a need to improve supports related to research travel particularly for students. Funds for publishing and dissemination are needed. Continual contract positions limit the ability to take on projects.

6.0 Innovation and Commercialization

Increasingly, the dissemination of research is being recognized as a valuable part of research activities. This dissemination includes the traditional academic publications and conference presentations, but it also includes innovations and partnerships that impact economic activities and commercialization of research outputs. Industrial and commercial activities occur in many disciplines. All too often a very narrow view of these terms is taken to mean selling out to corporate interests. This plan deliberately takes a broad definition of industry engagement and commercialization and includes community engagement through cultural and creative arts activities and does not restrict it to the scientific, engineering and manufacturing industries. In addition, while there are opportunities to conduct specialized research through research contracts with the private sector, it is extremely important to provide supports to help develop the research and scholarly activity that have potential to have a local economic impact.

6.1 PARTNERING WITH PRIVATE SECTOR

There are rich opportunities for faculty to be involved with research through private sector engagement. There are opportunities in the sciences, engineering, cultural sectors and hospitality & tourism sectors to name but a few. CBU will encourage and support faculty engagement with the private sector through the industry liaison officer. Currently, CBU has a

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

small number of faculty that have commercialized their research while a larger number are actively engaged in research connected to the private sector. These opportunities are quickly expanding and will play an important role in the research initiatives over the coming years.

6.2 COMMERCIALIZATION OF RESEARCH

When opportunities arise, CBU will support the commercialization of faculty research through the industry liaison office. Consistent with the collective agreements, faculty choosing to work with the Industry Liaison Officer (ILO) and CBU will be required to negotiate an agreement on the assignment of the intellectual property. The ILO will work with the faculty member to determine how best to pursue various commercial avenues such as licensing, start-up companies, spin-off companies, access to funding, etc.

7.0 Targets and Goals

One of CBU's major goals is to be recognized and respected regionally, nationally, and internationally as a university with an emerging substantial research expertise and productivity. CBU has moved from a knowledge store to a knowledge factory and over the next five years will work to transition to a knowledge hub.* Knowledge hubs actively facilitate the exchange of knowledge and know-how between academia and local private sector and are deeply embedded in the innovation system. However, this does not mean that they abandon research for purely academic purposes. Those universities that have the strongest research culture and impact on their local communities support all aspects of research. Faculty will be encouraged to be involved in scholarly activity that is of the highest academic standards that has potential to have impacts around the globe. While targets will naturally have to adjust to external conditions, over the period of this plan, we will strive to:

- 1) Increase the **total external research funding to \$6 million annually** (currently ~\$3 million) and in particular **double the funding received from tri-agency**. Tri-agency funding is not only recognized as the gold standard and often results in significant leveraging of funds through other research activities; it also has a nonlinear impact on the research funding and productivity. The number of CRCs, the amount of CFI allocation and the amount of the indirect costs of research grant are all tied to the % of tri-agency funding received by CBU. Thus, tri-agency funding is especially important.
- 2) Be in the **top three in comparison group**† for funding/faculty member (currently

* See Jan Youtie, Philip Shapira, Building an innovation hub: A case study of the transformation of university roles in regional technological and economic development, **Research Policy**, Volume 37, Issue 8, Pages 1188-1204, <http://dx.doi.org/10.1016/j.respol.2008.04.012>. for definitions of knowledge store, factory and hub.

† See the 2013 Annual Research Report for details of the comparison group, research funding and publication rates.

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

- 7th).
- 3) **Increase journal publications by 50%** from its current level of ~100 publications per year. While there will be a push to increase the quantity, there will also be an emphasis on quality. Researchers are expected to publish in well-respected, high impact journals.
 - 4) Be in the **top five in the comparison group** for publications/faculty member (currently 8th)
 - 5) Receive funding for at least **three major international development** projects
 - 6) Increase industry engagement and commercialization of research
 - 7) Have at least **one new spin-off or start-up company** resulting from research activities
 - 8) Increase the participation of undergraduate and graduate students in research by **20%** over current levels (currently ~150 undergraduate & ~65 graduate students participate in research)
 - 9) Develop appropriate **research graduate programs**, especially one connected to activities in the Verschuren Centre. These graduate programs will not be developed at the expense of undergraduate programs and will be expected to enhance the opportunities for undergraduates rather than reduce them. Programs will also have to be sustainable within the economic realities of CBU.
 - 10) Develop an internal structure to nominate faculty for external awards in recognition of research. A minimum of one nomination per year will be submitted.
 - 11) Develop a non-credit* research training course for students at the senior undergraduate and introductory graduate levels that will provide an introduction to research methods and skill sets, expanding core competencies, providing consistency in the creation of HQP at CBU and reducing demands on mentors to provide some forms of guidance. It will act as a segue to research culture for students that have an interest in graduate studies and will offer training in new forms of knowledge mobilization and translation.
 - 12) Redesign the ORGS website as a portal for all research & graduate studies activities

8.0 Measures of Success

The success of any strategic plan has to be measured in both short and long term goals. In the short term, success of this plan will be measured by an increase in research activity and a resulting increase in funding applications. Over the long term, success will be measured through increased graduate student programs and research; recruitment and retention of outstanding researchers; increased research activity and capacity; increased external funding; increased private sector partnerships; increased commercialization, knowledge transfer and dissemination of research through publications and conference presentations; and the development of a vibrant

* Course will initially be offered as non-credit but depending on demand, and resources, it may be developed as a for credit course in the future.

Strategic Research, Innovation and Commercialization Plan 2014 – 2019

research culture.

The key performance indicators that will provide a direct measure of success for this plan are:

- Research Funding
Achieve and maintain top 3 in comparison group
- Research Dissemination
Achieve and maintain top 5 in comparison group
- Industry Engagement & Commercialization
at least one new start-up/spin-off
- International Development
3 major projects
- Students
increased undergraduate & graduate student participation in research

9.0 Future Strategic Research Plans

As mentioned near the beginning of this document, the research concepts and foci identified in this plan do not represent the totality of research at CBU. As research programs evolve and new faculty members are hired, such existing areas, and others not yet recognized, indeed may be emphasized in future versions of the institutional research and innovation plan. In fact, it is hoped that the Strategic Research and Innovation plan will both guide and motivate the continuing development of a rich and productive research culture. The CBU Strategic Research and Innovation plan is dynamic and open to annual update as necessary with a complete re-examination every five years.