



The Conference Board
of Canada

Le Conference Board
du Canada

Impact of the University of Ottawa.



REPORT JANUARY 2016

Impact of the University of Ottawa

The Conference Board of Canada

Preface

This report was prepared for the University of Ottawa. It assesses the university's many contributions to the Ottawa region and to Ontario's economic, social, and cultural well-being—as well as to Canada as a whole, and even the world. To do this, it uses a combination of quantitative and qualitative approaches. This report highlights the impacts of the university on the local, provincial, and national economies, including the outcomes of operational expenditures, research and development, employment, and the generation of human capital. At the same time, the analysis explores how the University of Ottawa attracts both domestic and international talent, all while providing a high standard of bilingual education to its many students.

To cite this report: *Impact of the University of Ottawa*: Ottawa: The Conference Board of Canada, 2015

©2015 The Conference Board of Canada*

Published in Canada | All rights reserved | Agreement No. 40063028 | *Incorporated as AERIC Inc.

An accessible version of this document for the visually impaired is available upon request.

Accessibility Officer, The Conference Board of Canada

Tel.: 613-526-3280 or 1-866-711-2262 E-mail: accessibility@conferenceboard.ca

©The Conference Board of Canada and the torch logo are registered trademarks of The Conference Board, Inc. Forecasts and research often involve numerous assumptions and data sources, and are subject to inherent risks and uncertainties. This information is not intended as specific investment, accounting, legal, or tax advice. The findings and conclusions of this report do not necessarily reflect the views of the external reviewers, advisors, or investors. Any errors or omissions in fact or interpretation remain the sole responsibility of The Conference Board of Canada.

CONTENTS

i EXECUTIVE SUMMARY

Chapter 1

1 Understanding and Assessing the University's Impact

2 Purpose of the Study/Rationale

2 Measuring Impact

4 Applying the Framework

4 Research Methodology

6 Guide to the Report

Chapter 2

7 The Economic Footprint of the University of Ottawa

10 Impact of University Spending

10 Indirect Impact

12 Induced Impact

14 The Impact of University of Ottawa Research on Economic Growth

16 The Social Returns on University of Ottawa R&D

17 Impact of Non-Local Students and Out-of-Town Visitors

21 Direct Impact

22 Indirect and Induced Impacts

23 Impact of Post-Secondary Education on Earnings

24 Conclusion

Chapter 3

28 The University as a Generator of Impactful Research, Innovation, and Entrepreneurship

29 The Innovation Imperative

31 Entrepreneurship and Technology Transfer

33 Advancing Research in Other Fields

36 Areas of Research Excellence

51 Professional Schools

52 Conclusion

Chapter 4

53 The University's Unique Impact Through Bilingual Education

54 The University's Bilingual Commitment

59 Bilingualism Within the University's Local Context

61 Bilingualism in Comparison With Other Systems

63 Local and Global Linkages With La Francophonie

64 Conclusion

Chapter 5

65 Engaging Students and Impacting Local, National, and International Communities

66 Engaging Students and Helping Communities

66 Co-operative Education

68 A Social Citizenship Mandate

73 International Students

74 Ottawa–Gatineau's Immigrant Community

76 First Nations, Métis, and Inuit Students

77 Sustainability

78	Potential Impact in Good Governance
78	The University's Engagement in Digital Education
79	Conclusion

Chapter 6

81	Summary of Impacts
----	--------------------

Appendix A

84	Interviews
----	------------

Appendix B

86	Bibliography
----	--------------

Acknowledgements

This report was completed under the direction of Dr. Michael Bloom, Vice-President, Industry and Business Strategy. The authors and contributors are Dr. Michael Bloom, Jessica Brichta, Michael Burt, Veldon Coburn, Kareem El-Assal, Diana MacKay, and Dr. Carlos Ruano.

The Conference Board extends special thanks to the external reviewers, Dr. Carl Amrhein, Dr. John Isbister, and Dr. Someshwar Rao.

The report benefited from extensive interviews with experts and stakeholders. The university's senior administrative team provided valuable literature, data, and insights on the research questions. We extend our thanks to all of the individuals who gave generously of their time and knowledge.

The University of Ottawa provided financial support for the report.

Any errors or omissions in fact or interpretation remain the sole responsibility of The Conference Board of Canada.

EXECUTIVE SUMMARY

Impact of the University of Ottawa

At a Glance

- The University of Ottawa's total economic impact is \$6.8–\$7.4 billion annually.
- The university's activities contribute over \$1.5 billion annually to Canada's GDP, and generate and support over 29,500 jobs across Canada.
- University of Ottawa graduates living in the Ottawa–Gatineau census metropolitan area earn a wage premium of \$2.3 billion each year, and pay an additional \$591 million in federal and provincial personal income taxes as a result of their degrees.
- The cumulative impact of annual research spending by the university between 1971 and 2013 contributed nearly \$2.6 billion to Ontario's GDP in 2013.
- The social returns on the university's research spending are expected to yield \$479–\$958 million in 2015.
- The university plays a major role in delivering bilingual higher education in Ottawa –Gatineau and beyond, with an estimated annual investment of \$62 million— including \$32 million provided by the provincial and federal governments.

This report assesses the University of Ottawa's economic, social, and community impact.

As a leading research-intensive institution with a unique bilingual education mandate in Ontario, the university is currently, and is positioned to continue to be, an important generator of ideas, an innovation leader, a national top-10 research facility, a magnet for domestic and international talent, a collaborative learning network for graduates and faculty, an expert advisor to companies and governments, and a force in provincial and national innovation.

In sum, the university enhances the economic and social well-being of the Ottawa-Gatineau census metropolitan area (CMA), Ontario, and the nation.¹

Economic Impacts

The University of Ottawa's economic impact—from its operational expenditures, employment, spending on research and development (R&D), and the earnings premiums of its graduates—contributes more than \$6.8 billion to the combined Ottawa–Gatineau CMA, Ontario, and Canadian economies each year.

Employment Impact

The University of Ottawa has a substantial economic footprint. It has generated and currently supports an estimated 29,500 jobs across Canada as a result of its direct, indirect, and induced economic activities. (See [Table 1](#).) Some 23,845 of these jobs are located in the Ottawa–Gatineau CMA, which accounts for 3.5 per cent of total CMA area employment. An additional 2,519 jobs are located elsewhere in Ontario, and a further 3,167 throughout the rest of Canada.

¹ Throughout this report, we employ the term census metropolitan area (CMA) as used by Statistics Canada for demographic coverage. The Ottawa–Gatineau CMA is similar, though not exactly equivalent, to the National Capital Region (NCR).

Table 1

National Employment Impact of the University of Ottawa, 2011

(number of jobs)

	University operations	Student and visitor spending	Wage premium impact	Total
Direct	8,327	1,429	0	9,756
Indirect	1,583	913	0	2,496
Induced	3,939	493	12,848	17,280
Total	13,849	2,835	12,848	29,532

Source: The Conference Board of Canada.

GDP Impact

The University of Ottawa is a significant driver of the Canadian economy, contributing over \$1.5 billion annually to the national GDP. (See [Table 2.](#))

Table 2

National GDP Impact of the University of Ottawa, 2011

(\$ millions)

	University operations	Student and visitor spending	Total
Direct	798.4	132.7	931.1
Indirect	120.4	76.2	196.6
Induced	354.6	44.4	399.0
Total	1,273.4	253.3	1,526.7

Source: The Conference Board of Canada.

As an enterprise operator, it directly generates \$798.4 million annually in GDP for the CMA, which is equivalent to \$96,000 of GDP per employee—higher than the average GDP per employee of \$91,000 for all sectors in the CMA. (See [Table 3.](#)) Similarly, spending by non-local students and out-of-town visitors drawn to events hosted by the university directly supports more than 1,400 jobs and generates \$132.7 million annually in GDP. In total, university operations

IMPACT OF THE UNIVERSITY OF OTTAWA

and spending by non-locals support more than 9,700 jobs directly in the local economy. This is equivalent to 1.4 per cent of employment in the CMA.

Table 3

Ottawa–Gatineau CMA Annual GDP Impact of the University of Ottawa, 2011

(\$ millions)

	University operations	Student and visitor spending	Total
Direct	798.4	132.7	931.1
Indirect	83.7	49.4	133.1
Induced	255.3	28.0	283.3
Total	1,137.4	210.1	1,347.5

Note: The base year for the input-output simulations is 2011, the most recent year that data are available from Statistics Canada.

Source: The Conference Board of Canada.

R&D Spending Impacts

The University of Ottawa is one of Canada's research-intensive universities. Its \$2.6 billion R&D expenditures over the decade from 2004 to 2013 have resulted in significant economic contributions to the local, provincial, and national economies. Between 2003 and 2013, annual expenditures by the university on R&D rose by more than 75 per cent, reaching \$324 million—the third highest total among all universities in Ontario.²

Its large-scale and growing research activities attract top talent and major capital investments, create high-quality jobs, generate strategic partnerships, support private-sector innovation, further key federal and

2 CAUBO, *Financial Information of Universities and Colleges 2012/2013*; and CAUBO, *Financial Information of Universities and Colleges 2002/2003*.

provincial public policy agendas, and improve the lives of Canadians. Its research capacity thus fuels growth in the National Capital Region and beyond, and furthers provincial and national innovation agendas.

Cumulative Economic Impact of R&D Spending

The cumulative economic impact of R&D undertaken at the University of Ottawa between 1971 and 2013 contributed nearly \$2.6 billion to Ontario's GDP in 2013.

Social Returns to R&D Spending

Estimates of the social returns on the university's research expenditures are expected to be \$3.4–\$6.9 billion from 2015 to 2020, for rates of return of 30 per cent and 60 per cent. (See [Table 4](#).³) For 2015, the social returns are expected to be \$479–\$958 million.

Table 4

Annual Social Returns on the University of Ottawa's R&D Expenditures, 2015–20

(\$ millions)

	30 per cent returns	60 per cent returns
2015	479.1	958.2
2016	520.5	1,041.0
2017	563.4	1,127.1
2018	594.0	1,188.3
2019	626.7	1,253.7
2020	652.2	1,304.7
Total	3,435.9	6,873.0

Source: The Conference Board of Canada.

3 For a description of the assumptions applied to calculate the social returns, see below, [Chapter 2: The Economic Footprint of the University of Ottawa](#).

IMPACT OF THE UNIVERSITY OF OTTAWA

Domestically, the University of Ottawa consistently places in the top ten among all universities in Canada; it ranked eighth in the medical/doctoral category in the 2014 and 2015 annual Maclean's University Rankings. Among French degree-granting universities that offer medical and doctoral programs, the University of Ottawa is at the top of the Maclean's rankings, placing first in each of the past five years.

As a member of Canada's U15 group of research-intensive universities, the University of Ottawa has earned international standing for teaching and research excellence. It is one of only eight Canadian universities to make The Times Higher Education (THE) World University Rankings 2014–2015 top 200 list⁴ (ranked 188th in the world).⁵ Similarly, the QS World University Rankings 2014/15 places the University of Ottawa in the top 250 worldwide, ranking it 218th.⁶

These national and international rankings highlight the university's standing as a research and innovation leader. (See [Table 5](#).)

Table 5

Position of University of Ottawa, Canadian and International Rankings, 2011–15

	2015	2014	2013	2012	2011
Canadian rankings					
Maclean's—French degree granting	1	1	1	1	1
Maclean's—medical/doctoral rankings	8	8	10	10	10
International rankings					
The Times Higher Education	188	185	171	185	-
QS World Rankings	-	218	227	240	256

Note: The University of Ottawa places first in the annual Maclean's University Rankings compared to other Canadian universities that confer French medical and/or doctoral degrees.

Source: The Conference Board of Canada.

- 4 Rankings are generated based on four key impacts: teaching, research, knowledge transfer, and international outlook.
- 5 The Times Higher Education, *Rankings*.
- 6 Quacquarelli Symonds, *QS World University Rankings*.

Leading-edge researchers and equipment generate tangible benefits for regional and national innovation and commercialization.

The university's research intensity per full-time faculty in 2013 was \$231,900, placing it ninth in Canada—well above the national average for the top 50 universities. Independent assessments of Canada's medical/doctoral research universities rank the university's overall sponsored research income of \$297.8 million ninth nationally; total publications and publication impact at seventh place; and publication intensity at sixth place.

Its investments in biomedical sciences, earth sciences, and photonics, and its attraction of global top talent, including the Canada Excellence Research Chair in quantum nonlinear optics, has brought the university worldwide recognition and research engagement at the highest levels in these areas.

Leading-edge researchers and equipment generate tangible benefits for regional and national innovation and commercialization. For example, the university's new \$70-million Advanced Research Complex (ARC) houses sophisticated laboratory equipment that positions ARC as a strong resource for industry innovation and product commercialization.

Learning and Knowledge Transfer Impacts

Knowledge and skills gained by the university's students lead to higher productivity and higher earnings for its graduates. Bachelor's degree holders in Ottawa –Gatineau earn an average of \$56,596 annually and graduate degree holders earn \$69,400, compared to \$24,432 for individuals with a high school diploma or equivalent.

The wage premium earned by the university's graduates within the Ottawa–Gatineau CMA totals \$2.3 billion in additional income each year—equivalent to 3.9 per cent of the CMA's total personal income in 2014. Spending of this income supports an estimated 9,250 jobs in the CMA, accounting for 1.4 per cent of regional employment.

The university currently plays a significant role in providing and disseminating knowledge to business, government, and community organizations, which contributes to economic success and social and cultural well-being by informing policy-making, investment decisions, and program development.

Social and Community Impacts

The university has successfully expanded its work in lifelong community engagement in some respects. A notable area of success is its co-operative program. With 38,295 co-op placements in its 35-year history, it is the second-largest co-operative education program in Ontario. Co-op students gain valuable real-world learning experiences and job skills and can make better-informed career choices.

The university's track record of attracting talented people to study and live in Ottawa–Gatineau has long contributed to the social and cultural strength of the region. Its faculty and professional schools provide support and offer expert advice to community groups. Through the Michaëlle Jean Centre for Global and Community Engagement and other programs, the university connects its students to Ottawa–Gatineau's communities and the world. Students are engaged in community service and cultural activities. In 2014, over 4,000 students were community volunteers and community service learners. The Faculty of Medicine requires all of its students to complete a community service learning activity.

The Faculty of Law participates in the Pro Bono Students Canada (PBSC) program, providing placements for law students in a range of non-governmental and other not-for-profit organizations to provide free legal services. In addition to its PBSC program, the university operates a separate Community Legal Clinic, providing legal services free of charge to low-income and other historically disadvantaged members of the community. As part of the clinic, the Community Legal

In order to sustain high quality and equitable delivery of educational services in both official languages, the University of Ottawa–Gatineau spends \$62 million annually.

Education and Outreach Division delivers legal information sessions to educate members and organizations with respect to their legal rights, responsibilities, and obligations.

These experiences generate ties between the university and the region, and help graduates develop skills in leadership, engagement, and entrepreneurship. Given the university's commitment to bilingual education, these graduates make contributions to both the francophone and anglophone communities.

Alumni and other members of the University of Ottawa community have given back to the university. At the end of the 2013–14 fiscal year, the university's Endowment Fund stood at nearly \$234 million.⁷ Alex Trebek of television's *Jeopardy!* fame, one of the university's most famous graduates, has given over \$2.25 million and was recently honoured by the university with the naming of the new Alex Trebek Alumni Hall.⁸ Other alumni, such as Ian Telfer and Paul G. Desmarais, have respectively given \$25 million and \$15 million to the university and have been similarly honoured with the naming of the university's school of management and the building that houses it.⁹

Bilingualism

With a statutory mandate to further bilingualism and to preserve and develop French culture in Ontario, the University of Ottawa lays claim to the title of the world's largest French–English bilingual university.¹⁰ Among Ontario universities that deliver French and bilingual educational services, the university draws over 73 per cent of francophone students in the province. In order to sustain high-quality and equitable delivery

7 University of Ottawa, *Consolidated Financial Statements of University of Ottawa Year ended April 30, 2014*.

8 Loop, "Jeopardy! Host Alex Trebek has building at the University of Ottawa named in his honour."

9 University of Ottawa, "From humble beginnings to worldwide reputation." See also, University of Ottawa, "Desmarais Building to mark strong family ties to uOttawa."

10 *An Act respecting Université d'Ottawa, 1965*, s. 4(c).

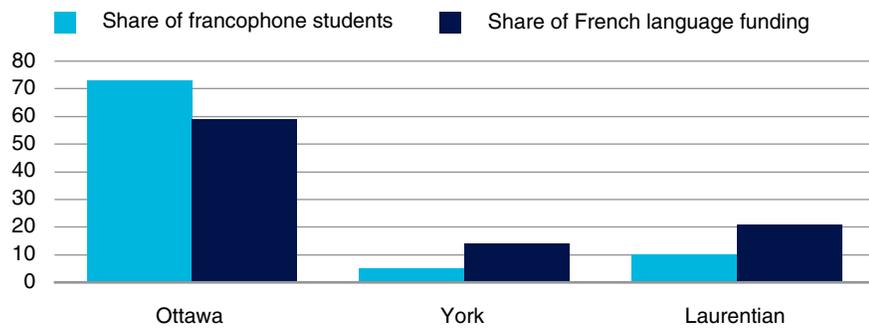
IMPACT OF THE UNIVERSITY OF OTTAWA

of educational services in both official languages, the University of Ottawa spends \$62 million annually. It receives \$32 million (59 per cent) of the \$54 million of combined provincial and federal funding available in Ontario annually to help offset its costs. (See [Chart 1](#).) Delivering on its bilingual commitments each year, the University of Ottawa well serves the Ottawa–Gatineau region, Ontario, and Canada.

Chart 1

Shares of Francophone Students and French Language Support Grants in Ontario Among Bilingual Universities, 2012–13

(per cent)



Source: The Conference Board of Canada.

CHAPTER 1

Understanding and Assessing the University's Impact

Chapter Summary

- The University of Ottawa invited the Conference Board to assess its contributions to the Ottawa–Gatineau region and Ontario's economic, social, and cultural well-being in order to provide an empirical basis for planning.
- The Conference Board applied its University Impact Framework to assess the University of Ottawa's economic, social, and cultural impacts, using a combination of quantitative and qualitative approaches.
- The methodology used includes economic modelling, a literature review of comparable studies, case studies, and key informant interviews.

Purpose of the Study/Rationale

The University of Ottawa invited the Conference Board to assess its contributions to the Ottawa–Gatineau region and Ontario’s economic, social, and cultural well-being in order to provide an empirical basis for planning. This study serves as a reference or mapping-out exercise of the university’s performance. It is intended to provide a global understanding of its impacts and point toward areas of further enquiry.

Measuring Impact

This study assesses the University of Ottawa’s economic, social, and community effects. In order to conduct the research and analysis, The Conference Board of Canada has applied our comprehensive University Impact Framework. This framework recognizes that universities can have a broad range of economic, social, cultural, and intellectual influence.

University Impact Framework

Economic Impacts

1. **Create employment.** It employs a large number of salaried and wage-earning faculty and staff, and sustains a substantial number of jobs in industries that supply the university (as well as its faculty, staff, and students) with a wide range of goods and services.
2. **Operate enterprises.** It owns and operates a substantial complex of buildings, properties, and equipment. When partnered or integrated with local economic strategies, the magnitude of the university’s operations can lead to a significant impact in terms of city-building, community development, and the development of robust supply chains for goods and services.

- 3. Create student and visitor consumers.** It houses large numbers of students who consume locally produced goods and services and attracts substantial numbers of domestic and international visitors, including family members, researchers, and conference and meeting attendees.

Knowledge Creation and Innovation Impacts

- 4. Create and discover knowledge.** It generates knowledge through original research and through knowledge-sharing.
- 5. Perform research and development.** Its R&D activities foster innovation, which produces economic and social value through the generation, development, and implementation of ideas. Many of these ideas help businesses and organizations create new or improved products, services, processes, capabilities, and strategies.
- 6. Generate knowledge-intensive enterprises.** Spin-offs from its research activities generate new ideas (“ideation”), products, services, and enterprises.

Learning and Knowledge Transfer Impacts

- 7. Produce skilled graduates.** A strong supply of highly skilled graduates fuels economic growth and social well-being for society, while graduates themselves and their families, employers, and communities benefit from the knowledge acquired and the transformative experience associated with higher education.
- 8. Provide expert advice and consultation services.** Business, government, and community organizations derive the benefits of improved corporate development and policy, which supports both economic success and social and cultural well-being.

Social and Community Impacts

- 9. Create a beneficial and attractive cultural environment.** A dynamic, diverse, inclusive, and welcoming cultural environment attracts highly skilled people (locally, from other provinces, and internationally); motivates them to stay; and improves quality of life.

10. **Develop leadership capacity.** Graduates help address growth challenges by taking leadership roles in business, government, and communities.

Applying the Framework

We have applied the University Impact Framework to examine and assess how the University of Ottawa is performing as an institution of higher learning; a generator of ideas; a research facility; a real-world problem-solver; a magnet for domestic and international talent; a collaborative learning network for graduates and faculty; a large employer of staff; an expert advisor to companies and governments; a driver of provincial and national innovation agendas; and more.

Our methodology examines the activities linked to the roles identified in the framework, the outputs associated with these activities, and the impacts of these outputs. This analysis blends qualitative and quantitative techniques.

Research Methodology

The Conference Board's research methodology independently assesses performance against the 10 types of impact identified in the University Impact Framework.

The report includes findings that emerged from the following research techniques:

- A review of published literature, including a wide variety of impact studies on universities in Canada and the United States, which provides data and situational analysis to understand the forces influencing and shaping the activities of the university.

- An input-output analysis using Statistics Canada and university data, which provides a measure of the university's direct, indirect, and induced economic impact.¹
- Over 20 interviews with university administrators, faculty, students, government leaders, alumni, employers, and community members, which provide expert perspectives on the university's performance.
- Case studies, which provide in-depth illustrations of specific initiatives of the university.

The analysis considers a continuum of impact, stemming from the university's established purpose and role through to its output and impact. Where possible, the report considers the potential output of new activities and related impact. (See [Exhibit 1](#).)

Exhibit 1

The Sequence for Analyzing the University's Economic Impact



Source: The Conference Board of Canada.

1 The base year for the input-output simulations is 2011.

Many Canadian and American universities have sought to quantify their impact through economic analyses.² These analyses typically focus on a subset of the full range of impacts we are exploring through our University Impact Framework. Their primary focus is on the economic impact of the university as an enterprise. They are less likely to consider the broader economic development impacts on the university's city and surrounding region. Most do not attempt to describe and evaluate impacts in areas such as developing human capital; enhancing knowledge; supporting diversity; and creating the conditions in which cultural, artistic, and other activities achieve positive social citizenship outcomes.

This report takes a more comprehensive approach. The following chapters explore the broad range of impacts described in the Conference Board's University Impact Framework.

Guide to the Report

Chapter 1 describes our University Impact Framework in order to understand the assessment process. In chapters 2–5, we use this framework to assess the university's performance.

- 2 See Briggs and Jennings, *The Economic Impact of the University of Alberta: A Comparative Approach*; Gardner Pinfold, *Economic Impact Analysis: Dalhousie University*; Gardner Pinfold, *Export Value of Nova Scotia Universities*; Healey and Akerblom, *Queen's University and the Kingston Area*; KPMG, *Western University Economic Impact Study*; MarketQuest, *Thriving Together*; PriceWaterhouseCoopers, *Regional Economic Benefits Study*; PriceWaterhouseCoopers, *University of Manitoba Economic Impact Analysis 2009*; Secor, *McGill University: Driving Excellence and Prosperity in Quebec*; University of British Columbia, *The Economic Impact of the University of British Columbia*; University of Ottawa, *2012 Economic Impact Study*; and University of Toronto, *Community Impact Report 2010*; University of Notre Dame, *The Economic Impact of the University of Notre Dame*; Tripp Umbach, *The Pennsylvania State University Economic Impact Statement*; and Tripp Umbach, *University of Iowa Economic Impact Study*.

CHAPTER 2

The Economic Footprint of the University of Ottawa

Chapter Summary

- The University of Ottawa's total economic impact is \$6.8–\$7.4 billion per year.
- The university's activities contribute over \$1.5 billion annually to Canada's GDP, and generate and support over 29,500 jobs across Canada.
- University of Ottawa graduates living in the Ottawa–Gatineau CMA earn a wage premium of \$2.3 billion in income each year, which is equivalent to 3.9 per cent of the CMA's total personal income. They pay an additional \$591 million in federal and provincial personal income taxes as a result of their degrees.
- The cumulative impact of annual research spending by the university between 1971 and 2013 contributed nearly \$2.6 billion to Ontario's GDP in 2013.
- The university's \$324 million annual research expenditures in 2013 were the third largest among Ontario universities.
- The social returns on its research spending are expected to yield \$479 million–\$958 million in 2015.

This chapter examines the university’s “footprint” as employer, job sustainer, enterprise operator, and generator of student spending (Impacts 1–3 in our University Impact Framework). Through these activities, the university makes its presence felt across the Ottawa–Gatineau CMA and beyond. We look at the economic footprint of the University of Ottawa’s operations from two perspectives: the impact of its spending; and the combined spending impact of non-local students who are attending the school and out-of-town visitors who are in the region for university-related functions.¹ An input-output analysis using 2011 Statistics Canada and university data provides a measure of the University of Ottawa’s direct, indirect, and induced economic impacts.²

Ottawa–Gatineau CMA

The Ottawa–Gatineau CMA is the grouping of census subdivisions that compose the urban area inclusive of both the Ontario and Quebec components of the Ottawa–Gatineau region. The CMA includes the cities of Ottawa, Gatineau, and 13 additional subdivisions such as Clarence-Rockland, Russell, and Val-des-Monts. This report uses Statistics Canada data for the Ottawa–Gatineau CMA to evaluate economic impact in the National Capital Region.

- 1 Non-local students and out-of-town visitors provide a net inflow of economic stimulus to the Ottawa–Gatineau CMA. Local students are not included in the calculation of net impact because their spending and economic activity is not incremental to the local economy since they are already a part of that economy.
- 2 The base year for the input-output simulations is 2011, the most recent year available from Statistics Canada.

Each of these activities quantifies three economic effects at the local, provincial, and national levels:

1. **Direct effects:** These are the economic effects directly associated with the university's operations and activities. For example, all of the people who actually work for the university would be included in the direct effects.
2. **Indirect effects:** The indirect or supply chain effects measure the economic effects associated with the use of intermediate inputs or other support services that are required for the university to operate on an ongoing basis. This includes a wide variety of inputs, such as building maintenance or transportation services.
3. **Induced effects:** The induced effects occur when the wages that employees earn from the direct and supply chain effects are spent. As such, the economic impacts associated with induced effects generally occur in consumer-oriented industries, such as retail.

The university plays an important role in developing people's skills. One result is that people with a university degree generally earn more than those without one. Below, we estimate the increase in earnings associated with University of Ottawa graduates who have remained in the Ottawa–Gatineau CMA.

In addition to these economic impacts, the University of Ottawa's environmental impact is worth noting. The university has grown in physical and enrolment terms while maintaining a constant CO2 footprint since 1993.³ This achievement is explored further in [Chapter 5](#).

3 Marc Joyal (Vice-President (Resources), University of Ottawa), in-person interview by Jessica Brichta and Carlos Ruano, February 25, 2015.

The university directly employs more than 8,300 people, including full- and part-time faculty, faculty in associated affiliated institutions, and support staff.

Impact of University Spending

The University of Ottawa is a significant economic force in Ottawa–Gatineau, with an annual budget of about \$1 billion.⁴ The university's single largest cost is salaries and benefits, which account for about 52 per cent of expenditures. The university directly employs more than 8,300 people, including full- and part-time faculty, faculty in associated affiliated institutions, and support staff.⁵ This is equivalent to 1.2 per cent of employment in the region in 2014.

The university's operations directly generate \$798.4 million annually in GDP. This is equivalent to \$96,000 of GDP per employee. In comparison, the average GDP per employee for all sectors of the Ottawa–Gatineau CMA is about \$91,000. Thus, the university has an above-average GDP impact relative to its employment. GDP at the industry level is primarily made up of wages and salaries, profits, and depreciation on assets. Since the University of Ottawa does not generate profits and is not particularly capital intensive, this result may be somewhat surprising. However, it reflects the fact that the university's average wage per employee is well above average.⁶

Indirect Impact

In addition to generating direct employment, the university also generates indirect economic effects. Indirect effects measure the economic benefits associated with the use of intermediate goods and services that are used as inputs by the university. Essentially, the indirect effects account for the university's supply chain, enumerating all of the inputs necessary to conduct its activities. The indirect effects are felt across a wide range of industries that directly supply the university, as well as the second- and third-order effects of suppliers further down the supply chain.

4 University of Ottawa, *Budget 2014–15*.

5 University of Ottawa, *Quick Facts 2014*.

6 Statistics Canada, CANSIM table 282-0129.

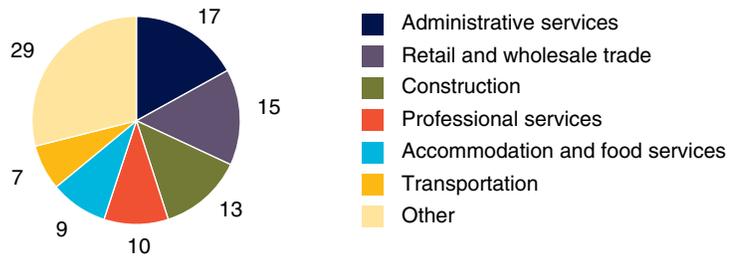
In aggregate, the University of Ottawa supports an additional 1,583 jobs as a result of indirect effects. Thus, the university accounts for a total of 9,910 jobs once the direct effects are added to the indirect effects. The indirect effects occur largely in Ottawa–Gatineau, but benefits do accrue across the country. Of the 1,583 indirect jobs, 1,100 occur in the region, 256 occur in the rest of Ontario, and 227 occur in the rest of Canada. Thus, 70 per cent of the supply chain impacts associated with the university’s spending remains in the local economy.⁷

The local indirect impacts are largely confined to six broad sectors, which together account for 77 per cent of the supply chain benefit associated with the university’s operations. In order of size they are administrative services; retail and wholesale trade; construction; professional services; accommodation and food services; and transportation and warehousing. (See [Chart 2](#).)

Chart 2

Key Sectors That Experience Local Supply Chain Effects From University of Ottawa Operations

(share of local supply chain employment effects, per cent)



Source: The Conference Board of Canada.

7 The local shares of the indirect and induced impacts discussed in this chapter are based on the industry mix of those impacts. Each industry is assigned a local impact share based on how easy it is to trade the industry’s products and how prevalent the industry is in Ottawa.

Since purchased inputs make up a smaller share of the university's budget compared with most other sectors, the indirect footprint that it generates is not particularly large.

Maintaining the university's buildings is a major part of the local impacts. For example, the administrative services sector, which accounts for nearly 20 per cent of the local supply chain employment impacts, includes activities like building cleaning, pest control, landscaping, and security services. As well, the impact on the local construction industry is largely the result of building maintenance and repairs.

The university's impacts in the local retail and wholesale trade sector, as well as the transportation sector, reflect its purchasing activity. For example, buying office or teaching supplies would have an impact on the local trade sector and require those inputs to be moved from where they are made or sold to where they are needed. The impacts in the professional services sector reflect demand for services such as accounting and legal services, but also spending on R&D activities not carried out by staff. Finally, the impact on the accommodation and food services industry reflects the university's outsourcing of its food services offerings on campus.

Also worth noting is that the ratio of indirect to direct employment effects for university operations is unusually low at only 0.19. A key reason for this is that a very large share of the university's expenditures is for wages and salaries. Since purchased inputs make up a smaller share of the university's budget compared with most other sectors, the indirect footprint that it generates is not particularly large. However, its large wage bill leads to considerable induced impacts.

Induced Impact

The last type of economic impact associated with the University of Ottawa's operations is the "induced effect"—the results from the people in jobs supported both directly and indirectly by the university spending their wages. Induced impacts provide an additional boost to GDP and employment, and they are felt across a wider range of industries than the supply chain effects described above.

The University of Ottawa supports an additional 3,939 jobs as a result of induced effects. The induced effects occur largely in Ottawa–Gatineau, but benefits do accrue across the country. Of the 3,939 induced jobs, 2,836 were created in the Ottawa–Gatineau CMA; 488 occur in the rest of Ontario; and 615 occur in the rest of Canada. Thus, 72 per cent of the supply chain impacts associated with the university’s spending remains in the local economy.

The distribution of the local induced employment effects across sectors is largely a reflection of how people spend their money. (See [Chart 3](#).) For example, the largest impact is in the retail sector, which accounts for 842 jobs, or 30 per cent of the total. The consumer-oriented financial services sector also benefits, with a total of 349 jobs created. Accommodation and food services, personal services, and health care and social services are other areas that experience major local induced impacts.

Chart 3

Key Sectors That Experience Local Induced Effects From University of Ottawa Operations

(share of local supply chain employment effects, per cent)



Source: The Conference Board of Canada.

Thus, the university accounts for a total of 13,849 jobs once all direct, indirect, and induced employment effects are combined, and 12,263 of those jobs are local ones.

University research supports and enhances economic growth. It does this through the development and transfer of new knowledge and improved technological capabilities, thereby increasing productivity.

The Impact of University of Ottawa Research on Economic Growth

Research undertaken by universities also boosts economic growth. As Edwin Mansfield's seminal economic studies on the relationship between academic research and industrial technological advances conclude, university research supports and enhances economic growth.⁸ It does this through the development and transfer of new knowledge and improved technological capabilities, thereby increasing productivity.

Economist Stan McMillan states:

On the one hand, universities provide skills and the ability to use those skills in the job market. In this sense, the university enables people to perform necessary job requirements society needs. On the other hand, university research and innovations stimulate the economy by introducing new technologies or performance improvements in many sectors. Technological changes flowing out of university research make labor and capital more productive, and thereby increase economic growth.⁹

In other words, research undertaken by universities raises GDP. Measuring this dynamic economic impact of university R&D relies on estimating what is known as total factor productivity (TFP): the growth in GDP attributable solely to technological improvements after accounting for changes in both labour and capital productivity. Fernand Martin has developed a method to estimate national-level GDP growth in Canada ascribed to TFP increases driven by university research.¹⁰ Martin's approach has been modified for applications at the sub-national level;¹¹ in recent years, universities across Canada have adopted and applied

8 See Mansfield, "Academic research and industrial innovation;" Mansfield, "Academic Research Underlying Industrial Innovations: Sources, Characteristics, and Financing;" and Mansfield, "Academic research and industrial innovation: an update of empirical findings."

9 McMillan, "*The Economic Impact of Continuing Operations of the University of Connecticut*," 7.

10 Martin, "The economic impact of Canadian university R&D."

11 Sudmant, Walter "The Economic Impact of the University of British Columbia," 23–28.

this method to provincial-level analyses to estimate their respective R&D impact on economic growth.¹² Martin's method—as adapted by Sudmant to provincial economies—entails estimating the portion of provincial GDP growth that can be explained by productivity gains resulting from the advancements of a particular university's R&D program. We apply the following assumptions developed by Martin to calculations that estimate the economic impact of the University of Ottawa's research:

- calculating GDP growth in Ontario between 1971 and 2013;¹³
- applying a factor of 20 per cent to estimate GDP growth attributable to TFP gains;¹⁴
- applying a factor of 69 per cent to exclude R&D effects on GDP growth originating outside of Ontario;¹⁵
- applying a factor to account for the share of productivity gains resulting from R&D expenditures made by Ontario universities;
- applying a factor to account solely for the University of Ottawa's portion of R&D.

Table 6 applies each step of the calculations listed above. Accordingly, the cumulative impact of the research done at the University of Ottawa between 1971 and 2013 contributed nearly \$2.6 billion to Ontario's GDP in 2013.

12 For example, UBC (2009); McGill (2010); Concordia (2011); Dalhousie (2011); Victoria (2012); and Western (2015).

13 Martin applies calculations derived from computations for 1971 and onwards from the OECD report, *Technology, Productivity and Job Creation, Vol.2, Analytical Report 1996*; the calculation here will underestimate TFP by omitting totals on productivity gains made prior to 1971.

14 Martin, "The Economic Impact of Canadian University R&D," 681.

15 Ibid., 681–82.

Table 6**Economic Impact of University of Ottawa Research, 1971–2013**

(\$ millions)

	Economic impact
GDP growth in Ontario since 1971	452,453
Growth attributable to total factor productivity (20% of above)	90,491
Exclusion of international and other provincial R&D effects (69% of above)	62,439
Share of R&D by Ontario universities (36% of above)	22,478
Share of Ontario university R&D by University of Ottawa (11.5% of above)	2,585

Sources: The Conference Board of Canada; Statistics Canada; CAUBO, Financial Information of Universities and Colleges 2012/2013.

The Social Returns on University of Ottawa R&D

There exist substantial social benefits resulting from academic research undertaken by the University of Ottawa. As Mansfield and others have pointed out, the spillovers from R&D activities—including basic, academic research—“lead to considerable economic benefits, both direct and indirect.”¹⁶ The assumption here suggests that innovation is dependent in large part on the advances developed through public expenditures in academic research. These theoretical assertions are supported by a growing body of empirical studies, a large number of which provide evidence that the social rate of return to academic research is in excess of 30 per cent and up to 60 per cent.¹⁷ Returns of these magnitudes are significant in the case of the University of Ottawa, which spent over \$2.6 billion on R&D between 2004 and 2013. Estimates of the social returns on the university’s research expenditures

16 Salter and Martin, “The economic benefits of publicly funded basic research: a critical review,” 509.

17 See Hall, Mairesse, and Mohnen (2009); Jones and Williams (1997); Mansfield (1991); and, Salter and Martin (2008).

are expected to be \$3.4–\$6.9 billion between 2015 and 2020, for rates of return of 30 per cent and 60 per cent. For 2015, social returns in the order of \$479–\$958 million are expected. (See [Table 7](#).)¹⁸

Table 7

Annual Social Returns on the University of Ottawa’s R&D Expenditures, 2015–20

(\$ millions)

	30 per cent returns	60 per cent returns
2015	479.1	958.2
2016	520.5	1,041.0
2017	563.4	1,127.1
2018	594.0	1,188.3
2019	626.7	1,253.7
2020	652.2	1,304.7
Total	3,435.9	6,873.0

Source: The Conference Board of Canada.

Impact of Non-Local Students and Out-of-Town Visitors

The university draws people to the region, many of whom are students. In fact, 57 per cent of the 43,600 registered students in the fall of 2014 came from outside the Ottawa–Gatineau region. The university also hosts a number of events, such as conferences and graduation ceremonies, which draw people to Ottawa–Gatineau. In order to estimate the economic impact of these additional people, we examine their incremental spending.

18 Following Mansfield (1991), estimates of the social returns to research assume that there is a lag period of seven years between expenditures and the commencement of returns; and that returns are generated annually for a period of eight years following the lag.

IMPACT OF THE UNIVERSITY OF OTTAWA

In the case of students, we include in our economic impact calculations only those who have come to the capital region from elsewhere, since the spending of people who were already in the region cannot be considered incremental. In the fall of 2014, 24,723 enrolled students came from outside the region, 18 per cent of whom were graduate students. (See [Table 8](#).) The breakdown between graduate and undergraduate students is important, since we assume that undergraduates remain in the region for only eight months of the year, but graduate students remain year-round. We then estimate the expenditures per student per month in order to calculate the total incremental spending impact of out-of-town students.

Table 8**Enrolment Breakdown by Student Origin, Fall 2014**

(number of students)

	Undergraduate	Graduate	Total
National Capital Region	16,208	2,669	18,877
Other	20,260	4,463	24,723
Total	36,468	7,132	43,600

Source: University of Ottawa.

Three types of student expenditures are incorporated in our analysis. The first is expenditures on housing, the second is expenditures on food, and the third is an “other” expenditures category that includes things like transportation, recreation, clothing, and communications.

In the case of housing, we assume a monthly cost of \$625, which is based on information from the university’s Financial Aid Office for the cost of an off-campus apartment.¹⁹ We also estimate that 3,400 undergraduate students are living in residence. These students are excluded from the spending estimates associated with housing since this money is paid to the university and its impacts are captured in the

¹⁹ University of Ottawa, *Financial Aid and Awards*.

operating results described in the previous section. The end result is that non-local students not living in residence spend \$117.8 million on housing in the Ottawa–Gatineau area. (See [Table 9](#).)

Table 9
Non-Local Student Annual Spending Estimates
 (monthly expenditures, \$; total expenditures, \$ millions)

	Graduate students	Undergraduate students		Total
		In residence	Not in residence	
Number	4,463	3,400	16,860	24,723
Months in Ottawa	12	8	8	
Monthly expenditures				
Food	300	450	300	
Housing	625	0	625	
Other	455	455	455	
Total expenditures				
Food	16.1	12.2	40.5	68.8
Housing	33.5	0	84.3	117.8
Other	24.4	12.4	61.4	98.2
Total	74.0	24.6	186.2	284.8

Source: The Conference Board of Canada.

Food spending estimates are broken down between spending on university meal plans and other types of food. Those with meal plans are assumed to spend \$450 per month, while those without meal plans are assumed to spend \$300 per month. Again, the figures are based on estimates published by the university’s Financial Aid Office. A key reason for the higher monthly expenditures associated with meal plans is that all of the spending is at food services businesses; as such, food preparation accounts for a significant share of the cost. In our calculations, only

In addition to the expenditures associated with non-local students, out-of-town visitors coming to the Ottawa region for university-related activities also have an impact.

those who are living in residence are assumed to have meal plans. The result is that non-local students are estimated to spend \$68.8 million on food in the CMA region.

Finally, we look at “other” expenditures that non-local students might undertake. The major categories we include in this group are spending on private transportation, clothing, communications, recreation, and personal care. The spending estimates are based on data from Statistics Canada’s Survey of Household Spending; specifically, spending figures for households in the lowest income quintile in Ontario.²⁰ In total, we estimate another \$455 per month in other expenditures for each student, which is equivalent to \$49.1 million in expenditures. Thus, non-local students spend a combined \$284.7 million in the Ottawa–Gatineau economy each year.

In addition to the expenditures associated with non-local students, out-of-town visitors coming to the Ottawa–Gatineau region for university-related activities also have an impact. A previous economic impact study conducted for the University of Ottawa sets the total number of annual out-of-town visitors to the University of Ottawa at 36,650.²¹ This figure includes visits associated with conferences, graduation ceremonies, prospective students, homecoming, and parents. We assume that spending per visitor is \$134.90 for conventions and \$94.51 for all other types of visitors. These figures are based on Ontario data from Statistics Canada’s Travel Survey of Residents.²² The result is that out-of-town visitors spend an estimated \$4.2 million in Ottawa–Gatineau annually. (See [Table 10](#).)

20 Statistics Canada, CANSIM Table 203-0022.

21 Mercier, and Duarte, *2012 Economic Impact Study*.

22 Statistics Canada, CANSIM table 426-0026.

Table 10
Out-of-Town Visitor Daily and Annual Spending Estimate

	Visits	Spending per day (\$)	Total spending (\$)
Homecoming	675	94.51	63,794.25
Graduation	7,590	94.51	717,330.90
Prospective students	4,200	94.51	396,942.00
Parents	3,600	94.51	340,236.00
Conferences	20,000	134.90	2,698,000.00
Total			4,216,303.15

Source: The Conference Board of Canada.

Direct Impact

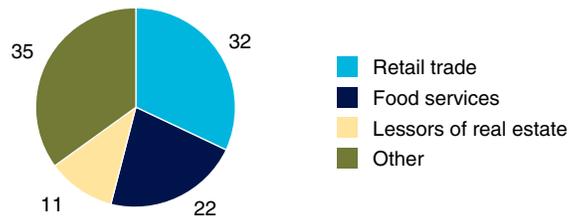
Spending by non-local students and out-of-town visitors totals \$288.9 million. To estimate the direct, indirect, and induced economic impacts of this spending, we used this figure (\$288.9 million) in Statistic Canada's input-output model. In terms of direct impacts, this spending supports 1,429 jobs and \$132.7 million in GDP. Thus, the combined impacts of university operations and spending by non-locals support 9,756 jobs directly in the local economy. This is equivalent to 1.4 per cent of employment in the region.

Most jobs are created in the retail trade sector, where 451 jobs are supported. (See [Chart 4](#).) Grocery stores account for the largest share of this impact, but clothing, department, and drug stores all benefit from the spending of non-locals. The food services industry and lessors of real estate also benefit.

Chart 4

Key Sectors That Experience Direct Effects From Non-Local Spending

(share of local direct employment effects, per cent)



Source: The Conference Board of Canada.

Indirect and Induced Impacts

Similar to the university's operations situation, the impacts associated with the spending by non-locals also generate indirect or supply-chain effects. An estimated 913 jobs are supported indirectly by the spending of non-locals, with 592, or 65 per cent, of those jobs being created locally. The local indirect impacts tend to occur in industries that support retailers and restaurants, such as building maintenance and repair, financial services, and professional services.

Finally, the induced impacts associated with non-local spending support 493 jobs across Canada, with 311 of the jobs (or 63 per cent) created locally. This is equivalent to 0.34 induced jobs for every direct job, which is lower than the ratio of 0.47 for university operations. A key reason for the lower ratio in the case of non-local spending is that the direct jobs this spending supports tend to pay below-average wages. Thus, each direct job generates a smaller induced impact.

When the direct, indirect, and induced effects are combined, non-local spending in Ottawa–Gatineau related to the university supports 2,834 jobs, with 2,332 of the jobs created locally.

An estimated \$2.3 billion in annual personal income in the CMA can be attributed to the university's impact on the local workforce's skills development.

Impact of Post-Secondary Education on Earnings

Another economic impact of the University of Ottawa comes from the improvement in lifetime labour-generated earnings that is associated with earning a university degree. A wide body of research has been conducted that looks at the returns on investment in education, and although those returns vary by discipline, they are generally positive for post-secondary education. For example, one study found that university degree holders generate a 36 to 46 per cent return to education versus high school graduates in Canada.²³

The effect of higher education is apparent in the income statistics for the Ottawa–Gatineau CMA. According to the 2011 Census, median incomes in the CMA stood at \$24,432 for people with a high school diploma or its equivalent. In comparison, median incomes for those with a bachelor's degree stood at \$56,596 and those with a graduate degree stood at \$69,400.²⁴ This educational differential is also influenced by factors such as people's experience, their gender, and the program that they graduated from, but the spread is considerable in most situations.

These wage differentials translate into a wage premium of \$32,164 for those with bachelor degrees and \$44,968 for those with graduate degrees versus people with a high school diploma. About 52,000 University of Ottawa alumni from undergraduate programs and about 14,500 alumni with graduate degrees live in the CMA region.²⁵

Combining these alumni figures with the median wage estimates allows for a calculation of the university's impact on local wages. In aggregate, an estimated \$2.3 billion in annual personal income in the CMA can be attributed to the university's impact on the local workforce's skills development. (See [Table 11](#).) This is equivalent

23 Ferrer and Riddell, "The Role of Credentials in the Canadian Labour Market."

24 Statistics Canada, 2011 National Household Survey: Catalogue Number 99-014-X2011036.

25 Diaz, Mercier, and Duarte, 2012 *Economic Impact Study*.

IMPACT OF THE UNIVERSITY OF OTTAWA

to 3.9 per cent of personal income in the CMA in 2014. In addition, approximately \$591 million of additional federal and provincial taxes are paid as a result of these wage premiums.

Table 11
Impact of Wage Premium for Those Educated at the University of Ottawa

	Wage premium (\$)	Federal taxes (\$)	Provincial taxes (\$)	After-tax wage premium (\$)	Local alumni (number)	Income effect before taxes (\$ millions)	Federal taxes (\$ millions)	Provincial taxes (\$ millions)	Income effect after taxes (\$ millions)
Bachelor degree	32,164	5,710	2,300	24,154	52,000	1,673	297	120	1,256
Graduate degree	44,968	8,527	3,472	32,969	14,500	652	124	50	478
Total					66,500	2,325	421	170	1,734

Source: The Conference Board of Canada.

What is more, when this additional income is spent, it produces an effect similar to the induced impact we estimated for university operations and the spending of non-locals. We estimate that the additional spending associated with the higher incomes of University of Ottawa graduates supports 12,848 jobs across Canada, with 9,250 of those jobs being local ones. Again, the distribution of these employment effects across sectors is largely a reflection of how people spend their money, with retailers, financial services, and food services all benefiting.

Conclusion

The University of Ottawa's economic impact—from its operational expenditures, employment, spending on research, and the earning premiums of its graduates—contributes \$6.8–\$7.4 billion to the Ottawa–Gatineau, Ontario, and Canadian economies each year.

The University of Ottawa has supported and generated an estimated 29,500-plus jobs across Canada as a result of its direct, indirect, and induced economic activities. (See [Table 12.](#)) Some 23,845 of these jobs are located in the Ottawa–Gatineau CMA alone, which accounts for 3.5 per cent of total CMA area employment. An additional 2,519 jobs are located elsewhere in Ontario, and a further 3,167 throughout the rest of Canada.

Table 12

National Employment Impact of the University of Ottawa, 2011

(\$ millions)

	University operations	Student and visitor spending	Wage premium impact	Total
Direct	8,327	1,429	0	9,756
Indirect	1,583	913	0	2,496
Induced	3,939	493	12,848	17,280
Total	13,849	2,835	12,848	29,532

Source: The Conference Board of Canada.

Local University of Ottawa graduates earn an additional \$2.3 billion in income each year, which is equivalent to 3.9 per cent of the Ottawa–Gatineau CMA’s total personal income, and pay an additional \$591 million in federal and provincial personal income taxes as a result of their degrees. When this income is spent, it supports a further 12,848 jobs across Canada, 9,250 of which are located in the Ottawa–Gatineau region.

The University of Ottawa is a significant driver of the Canadian economy, contributing over \$1.5 billion to the national GDP. (See [Table 13.](#))

IMPACT OF THE UNIVERSITY OF OTTAWA

Table 13

National GDP Impact of the University of Ottawa, 2011

(\$ millions)

	University operations	Student and visitor spending	Total
Direct	798.4	132.7	931.1
Indirect	120.4	76.2	196.6
Induced	354.6	44.4	399.0
Total	1,273.4	253.3	1,526.7

Source: The Conference Board of Canada.

As an enterprise operator, it directly generates \$798.4 million in GDP for the CMA, which is equivalent to \$96,000 of GDP per employee—higher than the average GDP per employee of \$91,000 for all sectors in the CMA. (See Table 14.) Similarly, spending by non-local students and out-of-town visitors drawn to events hosted by the university directly supports more than 1,400 jobs and generates \$132.7 million in GDP. In total, university operations and spending by non-locals support more than 9,700 jobs directly in the local economy. This is equivalent to 1.4 per cent of employment in the CMA.

Table 14

Ottawa–Gatineau CMA GDP Impact of the University of Ottawa, 2011

(\$ millions)

	University operations	Student and visitor spending	Total
Direct	798.4	132.7	931.1
Indirect	83.7	49.4	133.1
Induced	255.3	28.0	283.3
Total	1,137.4	210.1	1,347.5

Source: The Conference Board of Canada.

In addition to this, the cumulative impact of annual research spending by the University of Ottawa between 1971 and 2013 contributed nearly \$2.6 billion to Ontario's GDP in 2013. Between 2003 and 2013, its R&D expenditures rose by over 75 per cent, reaching \$324 million—the third highest among all universities in Ontario. The social returns on the university's research expenditures are expected to yield \$3.4–\$6.9 billion from 2015 to 2020, for rates of return of 30 per cent and 60 per cent. For 2015, social returns in the order of \$479–\$958 million are expected.

CHAPTER 3

The University as a Generator of Impactful Research, Innovation, and Entrepreneurship

Chapter Summary

- The University of Ottawa is one of Canada's top research-intensive universities and has an international standing in research and teaching excellence.
- In 2013, the university's research revenues totalled \$297.6 million.
- Between 2003 and 2013, annual expenditures by the university on R&D rose by more than 75 per cent, reaching \$324 million—the third highest among all universities in Ontario.
- The university is home to 161 research chairs, including a Canada Excellence Research Chair and 61 Canada Research Chairs. Its strong research performance in fields such as medicine, health, photonics, and earth sciences attracts major investments and strategic partnerships, furthering provincial and national innovation agendas.
- In 2015, the prestigious Max Planck Society entered into partnership with the university to establish the Max Planck–University of Ottawa Centre for Extreme and Quantum Photonics—one of only three Max Planck centres in North America.

The Innovation Imperative

This chapter assesses the university's performance in terms of knowledge innovation impacts. Innovation is a key driver of economic and social prosperity. The Conference Board of Canada's Centre for Business Innovation defines innovation as the process through which economic and social value is extracted from knowledge by generating, developing, and implementing ideas to produce new or improved strategies, capabilities, products, services, or processes.¹ We distinguish between types (product/services and process) and degrees (incremental and radical) of innovation.

Both the federal government and the Province of Ontario have prioritized investments in world-class research and technology, particularly in the fields of science and innovation. An important component of their strategies includes investing in, and partnering with, leading research-intensive universities to generate innovative science and technology research. The University of Ottawa has a substantial role to play in the innovation performance of the region and province through basic and applied research and research-intensive partnerships, and as a generator of entrepreneurial activity.

Independent assessments of Canada's medical/doctoral research universities rank the University of Ottawa seventh in overall sponsored research income, total publications, and publication impact, with a

1 The Conference Board of Canada, *Centre for Business Innovation: Innovation Defined*.

IMPACT OF THE UNIVERSITY OF OTTAWA

sixth-place ranking in publication intensity.² Its research intensity per full-time faculty is \$231,900—ninth nationally—well above the average for the top 50 universities in Canada.³

The University of Ottawa has also achieved an international standing for excellence. It is one of only eight Canadian universities to make The Times Higher Education (THE) World University Rankings 2014–2015 top 200 list (ranked 188th in the world).⁴ These national and international rankings highlight its standing as a research and innovation performer. (See [Table 15](#).)

Table 15
Position of University of Ottawa, International Rankings, 2011–15

	2015	2014	2013	2012	2011
The Times Higher Education	188	185	171	185	–
QS World Rankings	–	218	227	240	256

Source: The Conference Board of Canada.

The university's research effort has significant impacts on discovery that often underlie long-term developments in the economy. These impacts take two chief forms: first, contributions to the creation of new products, services, and processes through technology transfer and collaborations with business; and second, the development of entrepreneurs who establish new start-up businesses that raise capital, create jobs, and stimulate economic growth.

2 Research Infosource Inc., *Research Universities of the Year (RUY), 2014 Medical/Doctoral*.

3 Research Infosource Inc., *Canada's Top 50 Research Universities 2014*.

4 The Times Higher Education, *Rankings*. Rankings are generated based on four key impacts: teaching, research, knowledge transfer, and international outlook.

Most countries that rank high on innovation have successfully developed and implemented national innovation strategies, which are supported by strategic investments in post-secondary research institutions and business R&D activities.

The University of Ottawa's research also has more immediate and direct impacts on innovation and commercialization in Canada. This aspect is important because Canada is currently underperforming as an innovating nation in comparison with a peer group of advanced national economies. The Conference Board of Canada's *How Canada Performs on Innovation* scorecard ranks Canada only 13th among 16 peer countries on its innovation performance.⁵ Most countries that rank high on innovation have successfully developed and implemented national innovation strategies,⁶ which are supported by strategic investments in post-secondary research institutions and business R&D activities. Universities figure prominently in these strategies as centres of research and as partners in knowledge transfer and innovation/commercialization efforts.

The following sections demonstrate that the university has achieved significant results in basic research, including important discoveries in a number of areas. Its track record in applied research leading to commercialization and successful market entry of products and services in the economy is less impressive. In this context, the University of Ottawa, like other leading research-intensive universities in Canada, has a larger role to play than the one it currently plays.

Entrepreneurship and Technology Transfer

At least 62 companies have been established by university-connected entrepreneurs since 1996. The 44 start-ups created after 2004 have raised more than \$241 million in capital and created more than 200 jobs annually.⁷

- 5 See *How Canada Performs* scorecard for information on rankings and country indicators methodology.
- 6 For example, Switzerland's pharmaceuticals industry; Ireland's strength in attracting leading innovative companies; the U.S.'s fostering of top science and research faculties, an entrepreneurial culture, and deep capital markets; or Japan's commitment to new product development and efficient manufacturing. *How Canada Performs*. Innovation Indicators.
- 7 *Strategic Mandate Agreement (2014–17)*, The Ministry of Training, Colleges and Universities and University of Ottawa, April 16 and May 2, 2014, 4.

IMPACT OF THE UNIVERSITY OF OTTAWA

The university, including its medical research laboratories, has produced about 100 inventions, of which approximately 25 per cent are patented. The university produces 8–10 start-up companies annually, and the number is increasing year by year.⁸ Since 2003, 69 technologies with revenues greater than \$3 million have been licensed.⁹ Currently, the university has more research collaboration with government labs than with private industry.

Ottawa's location as the seat of the federal government and permanent international diplomatic missions affords the university earlier and faster access to potential global research and commercial collaborations. This is because embassies regularly bring delegations to the capital and facilitate meetings on bilateral and multilateral international collaborations.

Entrepreneurship is also used as a strategy for developing students' skills. The university's Start-Up Garage program "Y-Combinator" offers a competition for entry into a 90-day bootstrapping event for "pragmatic entrepreneurship." Jointly funded by the university and the Province of Ontario, it provides participants with space to operate and advice on how to operate a new business. The program has had real-world impact: in one instance 20 jobs were created by a participating entrepreneur in the first year of operation.

Another example of entrepreneurship support is Maker Space, a location for students and community members to access 3-D printing facilities and develop innovative products for social and commercial purposes. Students recently produced, using open-source engineering designs and the 3-D printer, an artificial hand for a six-year-old with a congenital malformation—for a cost of \$25, a tiny fraction of the price of a commercially produced artificial hand.¹⁰

8 Interview with Joe Irvine, Director, Technology Transfer and Business Enterprise, University of Ottawa, April 30, 2015.

9 *Strategic Mandate Agreement (2014–17)*, The Ministry of Training, Colleges and Universities and University of Ottawa, April 16 and May 2, 2014, 4.

10 Interview with Joe Irvine, Director, Technology Transfer and Business Enterprise, University of Ottawa, April 30, 2015.

A key measure of academic success is the ability to attract prestigious funding and recognition in the form of research chairs.

Advancing Research in Other Fields

Research Excellence in Canada

Research excellence and research revenues are closely aligned. Revenues have grown substantially in recent years; in 2013, the university generated research revenues in excess of \$297 million.¹¹ Between 2003 and 2013, annual expenditures by the university on R&D rose by more than 75 per cent, reaching \$324 million—the third highest amongst all universities in Ontario.¹²

A key measure of academic success is the ability to attract prestigious funding and recognition in the form of research chairs, which are awarded for research excellence in particular fields and supply the funds necessary to substantially advance research in those fields.

The University of Ottawa is currently home to 161 research chairs: 1 Canada Excellence Research Chair (quantum nonlinear optics), 61 Canada Research Chairs, 39 University Research Chairs, 3 University Health Research Chairs, 8 Research Chairs in Canadian Francophonie, and an additional 49 endowed and sponsored research chairs.¹³ University of Ottawa professors also receive numerous prestigious provincial, national, international, and tri-agency awards.¹⁴

The university brings top scholars together through its 29 research centres and institutes.¹⁵ It is affiliated with an additional 9 research institutes,¹⁶ hosts 2 networks,¹⁷ and is a member of 9 centres of excellence.¹⁸ These institutes, centres, and networks foster collaboration

11 University of Ottawa, *Quick Facts 2014*.

12 CAUBO, *Financial Information of Universities and Colleges 2012/2013*; and, CAUBO *Financial Information of Universities and Colleges 2002/2003*.

13 University of Ottawa Research, *Research Chairs*.

14 University of Ottawa Research, *Awards and Recognition*.

15 University of Ottawa Research, *uOttawa Research Centres and Institutes*.

16 University of Ottawa Research, *Affiliated Research Institutes*.

17 University of Ottawa Research, *Networks and Centres of Excellence*.

18 Ibid.

between researchers and other stakeholders from across the country and provide the foundation for continuous engagement with a broad range of communities across a wide variety of disciplines.

Innovative Research Relevant to the University's Performance

The University of Ottawa has pioneered an innovative approach to understanding and measuring the long-term impacts of the university's production of highly skilled graduates. In a pilot arrangement brokered with Statistics Canada, the university's Education Policy Research Initiative (EPRI) has developed a database that combines administrative data that include, graduating class by graduating class, virtually the entire body of undergraduate-level student files, with annual income tax files linked to those students from Statistics Canada. The database allows researchers to track the long-term income-earning performance of students from various disciplines and to compare and contrast performance on a number of levels.

Linking student files to tax records enables unprecedented analysis of students' post-graduation performance in the labour market. EPRI's researchers note that they are able to:

- track students' earnings on an annual basis following graduation;
- identify outcomes separately for each cohort of graduates;
- provide comparisons for graduates from different programs of study;
- compare outcomes along a range of earnings, including comparisons of those who do best in the labour market, those in the middle, and those who do the least well.¹⁹

Having robust labour market outcomes with the granularity provided by the EPRI project will give the University of Ottawa a much more comprehensive ability to assess student learning outcomes in economic terms. Likewise, the project will put valuable information in the hands

19 Finnie, Tracking Post-Secondary Education Students' Labour Market Outcomes Using a Tax Data Linkage Approach: An Overview.

Partnerships such as these ensure that the university is connected to top scholars and academic institutions around the world, and that its work is felt in the larger global community.

of students as they select their programs, university administrators and government officials as they allocate resources to programs and set policy, and employers who are active in various labour markets.

International Partnerships

The University of Ottawa is also expanding the impact of its international research. In 2013, through the Office of International Research, it signed over 70 new grants and contracts totalling \$3.7 million with international partners²⁰ and submitted 120 research proposals totalling \$9.5 million.²¹ Its top partner countries include France (21), Germany (19), Australia (18), the United Kingdom (14), China (11), and the United States (10).²² The university also encourages international research collaboration through specific funding programs. In 2013, it hosted 2 U.S. Fulbright scholars as Visiting Research Chairs, secured 2 of the 15 France–Canada Research Fund grants, established a \$90,000 Agreement for Research Cooperation with Argentina, hosted 8 Distinguished Visiting Researcher Program (DVRP) scholars,²³ and supported emerging collaborations with Australia, Brazil, China, France, Germany, India, and the United Kingdom through the International Research Acceleration Program (IRAP).²⁴ Partnerships such as these ensure that the university is connected to top scholars and academic institutions around the world, and that its work is felt in the larger global community.

20 This amount is \$1.4 million more than that of the previous year.

21 University of Ottawa Office of International Research, *The Year in Review 2013*.

22 Ibid.

23 From Australia, Argentina, Egypt, Israel (2), Mexico, Morocco, and Spain.

24 University of Ottawa Office of International Research, *The Year in Review 2013*.

Areas of Research Excellence

Research excellence is one of the four strategic goals of the University of Ottawa's *Destination 2020* plan. The university aims to rank among the top 5 research-intensive universities in Canada, and to rank in the top 100 in the world in select areas of excellence. To achieve this goal, it has identified four strategic areas of development in research, which include:

- **Canada and the World:** human rights, diversity, and social justice; la Francophonie; linguistics, official languages, and bilingualism; governance, international studies, and public policy; and multiculturalism;
- **Health:** brain and mind health, vascular health, regenerative medicine and innovative therapeutics, human development and health promotion, genetics and systems biology of disease, and practice-changing research;
- **e-Society:** enabling technologies, digital media and communications, technology and society, and photonics;
- **Molecular and Environmental Sciences:** catalysis and nanotechnology, environmental genomics, sustainable environment, renewable energy, and materials.²⁵

The University of Ottawa has strong research performance in several fields, including medicine, health sciences, photonics, and earth sciences. The following case studies outline some of the fields in which it has become a research and innovation centre. Research conducted at the university improves the lives of Canadians, attracts top talent, brings major capital investments to the National Capital Region, and contributes to the overall economic and social well-being of the province.

Biomedical Impacts

The University of Ottawa's medical faculty is mid-sized among the 17 medical faculties in Canada, with approximately 5.7 per cent of annual admissions to first year medicine in 2013.²⁶ Canada's 17 faculties of

²⁵ University of Ottawa Research, *Strategic Areas of Development in Research*.

²⁶ The Association of Faculties of Medicine of Canada, *Admission Requirements of Canadian Faculties of Medicine: Admission in 2013, 2013*.

Faculties of medicine across Canada have strong attraction power.

medicine and their affiliated teaching hospitals generate major economic and social impacts at both the local and national level. In the 2012–13 fiscal year, their economic impact totalled \$66.5 billion²⁷ (representing 3.5 per cent of Canada’s GDP), supported a total of 294,899 jobs across the country (1 in 60, or 1.7 per cent of Canada’s total employment), and generated over \$13.97 billion in government revenue.²⁸ Money invested in medical faculties produces strong returns. Every \$1 spent by medical faculties and their associated teaching hospitals indirectly generates an additional \$1.50, for a total impact of \$2.50 (a multiplier effect of 2.5).²⁹ Faculties of medicine across Canada have strong attraction power. They improve overall quality of life by creating new jobs, contributing to a highly educated workforce, advancing cutting-edge health research and high-quality patient care, and creating new medical businesses. They also play a key role in helping Canada’s provinces and territories meet increasing health sector demands.

The University of Ottawa’s Faculty of Medicine and its affiliated hospitals and institutes play a major role in enhancing the National Capital Region’s economic and social health. As the third-largest employer in the region (next to the public service and the City of Ottawa), they have significant economic impacts. They also attract major research investments, produce leading health advancements, improve both patient care and overall quality of life for local and international patients, and substantially enhance the capital’s profile and standing. [Case Study 1](#), “Contributions to Biomedical Excellence,” contains an overview of some of the achievements.

27 This figure includes both direct and indirect business volume generated. It includes quantifiable aspects such as capital and operational expenditures, faculty and staff pay and benefits, and visitor spending; but does not include additional economic development generated through associated activities such as research commercialization.

28 Tripp Umbach, *The Economic Impact of Canada’s Faculties of Medicine*.

29 Ibid.

Case Study 1: Contributions to Biomedical Excellence

The University of Ottawa's Faculty of Medicine and its affiliated research institute partners are key drivers of the university's overall ranking and standing for research excellence. Independent assessments rank its Faculty of Medicine as 2nd in Canada for research intensity in medicine and science, 3rd in Canada for papers and citations,³⁰ 4th best overall in Canada (68th worldwide),³¹ 5th in Canada for overall impact,³² and 54th worldwide for research impacts.^{33,34} Furthermore, the University of Ottawa's second-place rankings in both research intensity (grants per professor) in the medical/science fields and in nationwide publication growth since 1999³⁵ point to its commitment to research excellence. Should present trends hold, the university is expected to continue to improve its overall standing among peer institutions in Canada and around the world.

These rankings in turn attract top-quality students. According to the latest Canadian medical education statistics report, the university accounts for 5.7 per cent of total Faculty of Medicine enrolments in Ontario—behind only the University of Toronto and the University of Western Ontario (8.8 and 5.9 per cent, respectively).^{36,37} Across Canada, it is the 10th-largest granter of MD degrees (150 in 2013) and is the 5th-largest producer of post-MD trainees (1,020 in 2013).³⁸ University of Ottawa students regularly rank among the highest in the country on medical exams.³⁹

30 QS World University Rankings.

31 Ibid.

32 CWTS Leiden Rankings 2013.

33 QS World University Rankings.

34 University of Ottawa Faculty of Medicine, *Annual Report 2012–2013*.

35 University of Ottawa Faculty of Medicine, *Research Funding & Statistics*.

36 Total Ontario enrolments account for 31.4 per cent of the national total.

37 The Association of Faculties of Medicine of Canada, *Canadian Medical Education Statistics 2014*.

38 The Association of Faculties of Medicine of Canada, *Canadian Medical Education Statistics 2014*.

39 Jack Kitts (President and CEO, The Ottawa Hospital), phone interview by Jessica Brichta and Carlos Ruano, March 2, 2015.

Creating Hubs of Medical Research Innovation

Faculties' ability to attract funding grants for research work is a critical measure of research excellence. The university and its affiliated research institutes attract the seventh-largest portion of biomedical health care research revenues in Canada (\$128,991,000 in 2012–13).⁴⁰ Since 2013, they have had the second-highest growth rate (across all programs) in overall Tri-Council funding and the third-highest growth rate in Canadian Institutes of Health Research (CIHR) funding for medical school universities.⁴¹ Its medical faculty accounts for over 60 per cent of the university's total research grant funding.⁴²

Highly respected medical research is helping the university develop hubs of health innovation, particularly in the fields of neuroscience, cardiovascular science, and cancer treatment. The faculty is also spearheading new research programs in areas such as biomedical devices. This research environment continues to attract top medical researchers across a wide variety of fields. The university's Faculty of Medicine is now home to numerous Canada Research Chairs. (The four newest chairs include Dr. Seung-Hwan Lee in Viral Infection and Immunity, Dr. Ian Colman in Mental Health Epidemiology, Dr. William Stanford in Integrative Stem Cell Biology, and Dr. Pierre Blier in Mood Disorders.)⁴³ In total, the university's Faculty of Medicine has been awarded 26 Canada Research Chairs, 23 endowed and sponsored chairs, 12 Clinical Research Chairs, 3 University Research Chairs, 2 University Health Research Chairs, and 5 salary awards.⁴⁴

“ I knew this would be a place where I could be surrounded by world-class scientists who are doing cutting-edge research and bringing the latest treatments for all of their patients. And I knew this would be a place that I could reach my potential as a physician in making a big impact on patient care.”

Dr. Angel Arnaut, Surgical Oncologist

40 The Association of Faculties of Medicine of Canada, *Canadian Medical Education Statistics 2014*.

41 University of Ottawa Faculty of Medicine, *Research Funding & Statistics*.

42 University of Ottawa Faculty of Medicine, *Annual Report 2012–2013*.

43 University of Ottawa, *Four Members of the Faculty of Medicine Appointed as Canada Research Chairs*.

44 University of Ottawa Faculty of Medicine, *Current Research Chair Holders and Awards*.

Other medical researchers have also received recognition and prestigious awards. There are many recent examples. The Canadian Academy of Clinical Biochemistry (CACB) awarded Dr. Nathalie Lepage, Professor of Pathology and Laboratory Medicine, an award for Outstanding Contributions to the Profession of Clinical Biochemistry.⁴⁵ The United Kingdom's Faculty of Public Health (FPH) awarded Dr. Ronald Labonté, Professor in the School of Epidemiology, Public Health and Preventative Medicine an Honorary Fellow for exceptional service in public health.⁴⁶ The Royal Society of Edinburgh (RSE) named Dr. Jeremy Grimshaw, Professor of Epidemiology, Public Health and Preventative Medicine, a Corresponding Fellow for his leadership in the field of medical knowledge translation for clinicians.⁴⁷ The Department of Pediatrics faculty members received an International E-Learning Association Award for their iLEARN-Peds project.⁴⁸

University of Ottawa researchers have developed an international standing for groundbreaking medical discoveries and excellence in developing clinical decision rules that improve patient care, reduce unnecessary procedures, and save hospitals money. For example, three of the top five diagnostic tests used in North American hospital emergency rooms—the Canadian C-Spine Rule, the Canadian CT Head Rule, and the Wells Rule—were developed by physician-scientists at the university's affiliated Ottawa Hospital Research Institute, a scientific facility that annually attracts over \$100 million in research funding.⁴⁹ Recommended by the American Board of Internal Medicine Foundation's *Choosing Wisely* campaign, these rules are being promoted in prestigious medical journals, such as *JAMA Internal Medicine*,⁵⁰ and are being implemented by emergency room doctors across the United States to spare patients from uncomfortable and unnecessary diagnostic procedures and save hospitals both

45 University of Ottawa, *Canadian Academy of Clinical Biochemistry Honours Dr. Nathalie Lepage*.

46 University of Ottawa Faculty of Medicine, *Dr. Ronald Labonté Elected to the United Kingdom's Faculty of Public Health*.

47 University of Ottawa Faculty of Medicine, *Dr. Jeremy Grimshaw honoured as a Fellow by Scotland's national academy*.

48 University of Ottawa, *Pediatric Team Wins International E-Learning Association Award*.

49 The Ottawa Hospital, *Message from the Chair of the Board and the President and CEO*.

50 Schuur and Michael, "A Top-Five List for Emergency Medicine."

time and money.⁵¹ Countries throughout Europe and Asia are also implementing many of the clinical decision rules developed by university researchers, including Dr. Stiell's world-renowned Ottawa Ankle Rules.⁵² Through international adoption, leading Ottawa-based research is translating into world-class medical care, which benefits patients all over the world.^{53,54}

“ “ We are not surprised that three of the five top-ranked items were based on clinical decision tools developed in Ottawa. The physician-researchers from Ottawa are international leaders in developing useful bedside tools for critical diagnostic questions. It is a remarkable feat.”⁵⁵

Dr. Jeremiah Schuur, Brigham and Women's Hospital Department of Emergency Medicine, Boston, Massachusetts

51 University of Ottawa, *U.S. emergency rooms adopting made-in-Ottawa diagnostic procedures*.

52 Ibid.

53 Jack Kitts (President and CEO, The Ottawa Hospital), phone interview by Jessica Brichta and Carlos Ruano, March 2, 2015).

54 Duncan Stewart (Chief Executive Officer and Scientific Director, Ottawa Hospital Research Institute), phone interview by Jessica Brichta, March 11, 2015.

55 Ibid.

Promoting Local and International Collaboration

The University of Ottawa's medical faculty is affiliated with five hospitals,⁵⁶ eight medical centres,^{57,58} eight prestigious research institutes,^{59,60} and four additional research centres.^{61,62} Cross-appointments overcome traditional divides between academia and clinical care. These hospitals, medical centres, research institutes, and research centres also represent substantial direct health impacts and community engagement. For example, the University of Ottawa Brain and Mind Research Institute (uOBMRI) brings faculty research members, resident hospitals, affiliated networks, and local research institutes together to work collaboratively on research focusing on the brain and mind-related health; develop new therapies for neurological and psychiatric disorders; and implement fundamental patient care changes.⁶³ A world leader in the treatment of brain disorders and neuroscience research, uOBMRI also founded the Brain Health Awareness Week⁶⁴ and undertakes substantial community engagement through numerous lectures and educational events, both in the National Capital Region and across the country.

The university also plays a central role in meeting the needs of key population segments. It serves Ontario's francophone population by providing health services in French. Through shared coursework and social activities, it brings francophone and anglophone cultures together and connects its students to 140 other francophone faculties of medicine (both within Canada and around

- 56 Bruyère Continuing Care, Children's Hospital of Eastern Ontario, The Ottawa Hospital, Montfort Hospital, and the Royal Ottawa Mental Care Group.
- 57 At Winchester District Memorial Hospital, Brockville Mental Health Centre, Cornwall Community Hospital, Hawkesbury Hospital, North Bay Regional Health Centre, Pembroke Regional Hospital, Queensway-Carleton Hospital, and Renfrew Victoria Hospital.
- 58 University of Ottawa Faculty of Medicine, *Affiliated Institutions*.
- 59 CHEO Research Institute, Élisabeth-Bruyère Research Institute (ÉBRI), The Royal's Institute of Mental Health Research, Institut de Recherche de l'hôpital Montfort (IRHM), Ottawa Hospital Research Institute (OHRI), Ottawa Institute for Systems Biology (OISB), University of Ottawa Heart Institute (UOHI), and the University of Ottawa Brain and Mind Research Institute (uOBMRI).
- 60 University of Ottawa Faculty of Medicine, *Research Institutes*
- 61 Centre for Neural Dynamics, Centre for Neuromuscular Disease, Centre for Research in Biopharmaceuticals and Biotechnology (CRBB), and the HSF Canadian Partnership for Stroke Recovery.
- 62 University of Ottawa Faculty of Medicine, *Research Centres*.
- 63 University of Ottawa, *About the Institute*.
- 64 University of Ottawa, *Brain Health Awareness Week*.

the world).⁶⁵ Its Faculty of Medicine is a strong supporter of improving Aboriginal health outcomes. It is one of 11 Canadian faculties of medicine involved in a national project committed to addressing the lack of equivalent health services in Aboriginal communities and training 1,000 Aboriginal physicians over the next 10 years. The university has committed to training 100 of these physicians.⁶⁶

The faculty is involved in the Future of Medical Education in Canada (FMEC) project, a comprehensive review of Canada's current medical education status designed to ensure that Faculty of Medicine curricula in Canada continue to align with societal needs⁶⁷ and support the overall sustainability of Canada's health care system.

To strengthen the university's global connections, the Faculty of Medicine connects with leading institutions around the world to develop research capacity and partnerships. Groundbreaking new international partnerships include the Shanghai Institute of Materia Medica (SIMM), through a joint laboratory in mass spectrometry and proteomics; the Dalian Institute of Chemical Physics, through a joint research laboratory in proteomics and systems biology; the Shanghai Institutes for Biological Sciences (SIBS), through institutions specializing in systems biology; the Ottawa Hospital Research Institute/The Ottawa Hospital/Institute of Zoology/Shanghai Institutes of Biological Sciences, through reproductive biology research; the Université Paris-Descartes, through neuroscience, medical leadership, and conferences; the Shiga University of Medical Science, through brain and mind sciences, cardiovascular science,⁶⁸ and medical pedagogy; and the Hebrew University, through its Institute of Medical Research Israel–Canada (IMRIC) in neuroscience, bioinformatics and computational biology, women's health, and cancer.⁶⁹

Many of the University of Ottawa's medical partnerships are among the first of their kind in Canada. For example, on October 17, 2014, the University of Ottawa announced the creation of a joint medical program with China's Shanghai Jiao

65 Jacques Bradwejn (Dean, uOttawa Faculty of Medicine), phone interview by Jessica Brichta, March 17, 2015.

66 Ibid.

67 The Association of Faculties of Medicine in Canada, *The Future of Medical Education in Canada*.

68 The University of Ottawa Heart Institute is the largest cardiovascular health centre in Canada.

69 University of Ottawa Faculty of Medicine, *International Collaborations*.

Tong University School of Medicine (SJTUSM). Working with Renji Hospital (Shanghai's first Western-style hospital), the university surpassed competing partnership bids from other Canadian research-intensive universities and U.S. Ivy League schools, to create the first Sino-Canadian joint medical program—the first North American medical education (MD) program to be adopted in China.⁷⁰ Both institutions have already committed \$1 million each to medical research and education innovation and will offer student and faculty exchanges, with opportunities to learn about both Western and traditional Chinese medicine, language, and culture.⁷¹ Both countries will benefit significantly from this partnership. High patient volumes at both Renji Hospital and other Shanghai hospitals offer unprecedented opportunities for Canadian students and doctors to gain critical clinical experience (e.g., doctors and residents who would have the opportunity to see several liver transplants a year here in Canada could see several per week in Shanghai).⁷² To address China's significant needs, the universities are also working on developing dual MD degrees as well as family medicine and other joint residency programs.⁷³ This groundbreaking partnership will serve as a model for other international partnerships.

International partnerships encourage student, post-doctoral fellow, clinical staff, and professor mobility; knowledge sharing; the establishment of international collaborative research teams; innovative technical, educational, and scientific cooperation; and the development of joint degree programs and symposiums. They broaden the perspectives of both students and professors and create opportunities for new partnerships and collaborations as part of a broader global medical community.

The University of Ottawa's partnerships with leading medical institutions in other countries are strengthening its international connections and providing Canadian medical students and professors with international opportunities in world-class medical research facilities. Through partnerships like these, its medical faculty helps fulfil the university's goals of providing rich and inspiring student experiences, achieving research excellence, promoting bilingualism, and boosting internationalization.

70 University of Ottawa Faculty of Medicine, *Ottawa-Shanghai Joint Medical Program a First*.

71 University of Ottawa Faculty of Medicine, *Ottawa-Shanghai Joint Medical Program a First*.

72 Jacques Bradwejn (Dean, uOttawa Faculty of Medicine), phone interview by Jessica Brichta, (March 17, 2015).

73 Ibid.

Across the country, research-intensive universities are reaping the results of major capital investments in research excellence.

Photonics and Earth Sciences

The University of Ottawa is a technological innovator. With the opening of its Advanced Research Complex (ARC), the university has embarked on an ambitious path of establishing itself as a global photonics leader and the epicentre of geoscience research in Canada.⁷⁴ Across the country, research-intensive universities are reaping the results of major capital investments in research excellence. The University of Ottawa's new \$70 million facility brings researchers from different disciplines together and bridges traditional gaps between basic research and technology development. It does this by focusing on developing new technologies that improve the everyday lives of Canadians.⁷⁵ The following case study, "A Global Photonics and Geoscience Research and Innovation Leader," highlights some of the ARC's national and international activities and impacts.

Case Study 2: A Global Photonics and Geoscience Research and Innovation Leader

Over the past several decades, Ottawa–Gatineau has become an important centre in photonics research. The University of Ottawa has made major capital investments in science and technology and is conducting cutting-edge research in the field along with dozens of private companies.⁷⁶ These are propelling the university through both national and international rankings. The university's investment in the Advanced Research Complex (ARC) will help the university further its goal of becoming one of the top five research-intensive universities in Canada by 2020. As a world-class photonics and earth sciences research facility, the ARC also benefits and adds prestige to the National Capital Region.

74 University of Ottawa, *Earth, Sun and Light: The New Advanced Research Complex*.

75 Ibid.

76 Howell, "Aiming for a Quantum Leap."

A Top Talent Magnet

The ARC's creation rests largely on the research excellence already present at the University of Ottawa. In 2008–09, two leading researchers, physicist and National Research Council (NRC) scientist and Canada Research Chair Dr. Paul Corkum and geoscientist Dr. Ian Clark, independently attracted over \$26 million in grants from the Canada Foundation for Innovation and the Ontario Research Fund—grants that provided the initial funding needed for the construction of the research hub.⁷⁷ Now that construction is complete, this leading scientific research and innovation hub will continue to act as a talent magnet, attracting high-quality scholars—as well as other academic, research, and business partners—who want to work with leading researchers in their fields. Top talent attracts both additional investments and other eminent researchers, and the ARC already houses a large number of leading scientists and Canada Research Chairs. Furthermore, the Canada Excellence Research Chair (CERC) in quantum nonlinear optics, with renowned scientist Robert Boyd as the chairholder, was jointly established in September 2010 by the Government of Canada and the University of Ottawa. The primary goal is the establishment of a world-class research program in nanophotonics methods for quantum nonlinear optics at the University of Ottawa. The ARC officially opened in 2014.⁷⁸

As the foremost photonics and earth sciences research facility in the country, the ARC will also attract top graduate students—both nationally and internationally—who will now have the opportunity to work with the newest technology in the country's most advanced labs. The ARC houses a 44-tonne accelerator mass spectrometer (AMS) used to detect and analyze trace radioisotopes.⁷⁹ It is a \$10-million facility and the only one of its kind in Canada. AMS managers and laboratory technologists from across North America are coming to Ottawa for training.⁸⁰ Leading scientists such as Dr. Jack Cornett have already left prestigious positions elsewhere to come to the University of Ottawa to work with the spectrometer.⁸¹

77 Roy-Sole, *The launch of uOttawa's ARC*.

78 *The Ottawa Citizen*, "U of O Opens Advanced Research Complex."

79 University of Ottawa Gazette, "Sneak Peek at the Advanced Research Complex."

80 University of Ottawa, *Earth, Sun and Light: The New Advanced Research Complex*.

81 Geller, *No Small Feat*.

The university's researchers are highly respected internationally. For example, Dr. Paul Corkum, also known as the father of attosecond molecular imaging, received the 2013 \$75,000 Harvey Prize (which recognizes science and technology breakthroughs for researchers who have a measurable impact on humanity's progress)⁸² for his work with ultra-fast light pulses that observe the smallest subatomic particles.⁸³ In 2015, Dr. Corkum was selected as a Thomson Reuters Citation Laureate, a recognition for "the most influential researchers" in the sciences "who are likely winners of the Nobel Prize now or in the future."⁸⁴ Dr. Corkum's research is applicable in a variety of disciplines, including medicine, engineering, computing, and telecommunications. Dr. Clark is best known for his pioneering environmental and earth sciences isotope research.⁸⁵

Cultivating International Pre-Eminence: The Max Planck–University of Ottawa Centre for Extreme and Quantum Photonics

The university's reputation for excellence in photonics has attracted prestigious international institutions and widely renowned researchers who want to affiliate and collaborate. The Max Planck Society for the Advancement of Science—which has produced 18 Nobel laureates—entered into a formal partnership with the University of Ottawa to establish one of only three Max Planck centres in North America. This partnership, inaugurated in May 2015, will institute the Max Planck–University of Ottawa Centre for Extreme and Quantum Photonics, which will be housed in the Advanced Research Complex. The centre will provide opportunities for researchers from the University of Ottawa to engage in and collaborate on leading-edge research in areas such as the development of very high-intensity laser sources, optical methods of relevance to quantum information, and the fabrication of devices for use in classical and quantum photonics.⁸⁶

82 Prize, *Home*.

83 University of Ottawa Gazette, "Physics Professor Wins International Prize for Ultra-Fast Light Pulses."

84 Thomson Reuters, "'People's Choice' Poll for the Nobel Prizes in the Sciences Opens."

85 Rushton, "Atomic Tour de Force."

86 University of Ottawa, "Prowess in photonics brings third Max Planck Centre in North America to the University of Ottawa."

A Generator of Research That Improves the Lives of Canadians and Supports Industry

The AMS will be used to conduct groundbreaking research in fields that have major implications for Canadians. From health (e.g., advancing biomedical research in drug discovery, toxicology, and rare isotope measurement), to nuclear waste disposal and environmental contaminant effects, to radiocarbon dating of archaeological finds, the spectrometer has impressive and wide-ranging applications⁸⁷ that can improve the health and well-being of populations across the country.

The spectrometer also has important implications for industry. For example, Dr. Reiko Hattori's lab will use the AMS to improve mining exploration by better identifying uranium, copper, and other metal deposits; and mitigating chemical and gas disruption once mining projects are under way.⁸⁸ Dr. Danielle Fortin's geomicrobiology lab⁸⁹ is exploring how bacteria can help decontaminate mining waste—an important goal for the Canadian mining industry, which generates over 650 million tonnes of heavy metal and chemical waste that affects both humans and the environment.⁹⁰ The ARC's scientific discoveries will bring long-lasting social and economic benefits.

“ “ The new facilities will help the photonics and Earth sciences teams in developing new technologies that will lead to improvements in our everyday lives. More accurate medical diagnoses, faster telecommunications, safe disposal of nuclear waste and the development of solar energy are a few of the examples of the solutions to today's world challenges that ARC will be able to tackle.”⁹¹

Mona Nemer, Vice-President, Research, University of Ottawa.

87 Ibid.

88 Eggertson, “Under the Volcano.”

89 The first of its kind in Canada.

90 Coupal, “Metal Sponges and Iron-Eating Bacteria.”

91 University of Ottawa, *Earth, Sun and Light: The New Advanced Research Complex*.

A Collaboration Hub

As a nexus of interactive scientific exchange, the ARC is designed to foster collaboration and innovative connections among academic researchers, innovators, partners, and students in a variety of related fields, from both across Canada and around the world. The building's physical design matches its conceptual framework of transparency, collaboration, and the breakdown of barriers. Its two-storey glass lobby illustrates this. Those passing by can view the earth sciences laboratory, unlike most research labs, which are removed from the public eye.⁹² The building also features highly advanced equipment, facilities, and 10 specialized laboratories with vibration-resistant floors.

The building's multidisciplinary model brings researchers from different scientific and engineering disciplines together to generate an innovation pipeline through which fundamental research is transformed into technological development.⁹³ Concentrating multidisciplinary researchers in one location and sharing expensive research tools is also efficient from both a scientific process and cost-effective perspective.⁹⁴ This concentration of expertise will also benefit the broader research and business community, as many government labs and more than 120 companies are currently working in photonics and optics—a collaboration opportunity many of the University of Ottawa's researchers are excited to explore.⁹⁵

“ I've always felt there's a disconnect between academia and industry. My interest is in how to actually translate all this research into something that is useful to people.”⁹⁶

Dr. Hanan Anis, engineering professor

92 University of Ottawa, *The Launch of uOttawa's ARC*.

93 Ibid.

94 Lougheed, “Getting a Good Vibe.”

95 Moranz, “Shared Dreams and Laser Beams.”

96 Williamson, “Using the Science of Light to Save Lives.”

A Provincial and Federal Innovation Policy Partner

Both the federal government and the Province of Ontario recognize the importance of research and technology in strengthening Canada's position in the global knowledge economy, driving productivity, and benefiting the lives of Canadians. One of the federal government's key innovation investment vehicles is the Canada Foundation for Innovation (CFI). The Government of Ontario also funds transformative research that has strategic value to the province (specifically the operational costs of large-scale transformative research) through the Ontario Research Fund (ORF).⁹⁷ Both the CFI and the ORF are major investors in the University of Ottawa's new \$70-million facility. These investments speak to the university's ability to generate transformative research, develop new researchers, attract and retain top global talent, create high-quality jobs, and support private-sector innovation.⁹⁸ These elements are also part of federal and provincial innovation public policy agendas. Investing in cutting-edge research facilities at the University of Ottawa strengthens Ottawa's position as a research and innovation leader in photonics and geosciences.

“ The federal government is making record investments in science and technology to create jobs, strengthen the economy and improve the quality of life for Canadians. Through the Canada Foundation for Innovation, the government has invested in the Advanced Research Complex in order to position Ottawa as a photonics and geosciences powerhouse and enhance the University of Ottawa's leadership in research and innovation.”⁹⁹

Royal Galipeau, Former MP for Ottawa–Orleans

97 Government of Ontario, *Ontario Research Fund: Research Excellence*.

98 Canada Foundation for Innovation, *About Us*.

99 University of Ottawa, *Earth, Sun and Light: The New Advanced Research Complex*.

Professional Schools

The University of Ottawa is home to highly esteemed professional schools in fields such as business and law, which have a major community impact. In partnership with a wide variety of businesses and organizations, the Telfer School of Management has extensive co-operative education agreements in areas such as accounting, general management, and the management of information systems. With a co-op placement rate of 98 per cent, the university helps both local and national employers meet their demands for a highly skilled workforce.

Through its distinguished alumni and current students, the Faculty of Law has had an extensive and profound impact on the legal profession in Ontario and elsewhere. The Faculty's alumni roster contains some of the leading legal practitioners and jurists in Canada. From scholars, to judges, to practising attorneys, Faculty of Law graduates have left their mark and continue to contribute to the legal thinking and the evolution of jurisprudence in Canada and internationally.¹⁰⁰ They have helped shape much of the Canadian legal scene in areas such as language and education, Aboriginal rights, and others.

The Faculty of Law participates in the Pro Bono Students Canada (PBSC) program, providing placements for law students in a range of non-governmental and other not-for-profit organizations to provide pro bono legal services. In addition to its PBSC program, the university operates a separate Community Legal Clinic, providing legal services free of charge to low-income and other historically disadvantaged members of the community. As part of the clinic, the Community Legal Education and Outreach Division delivers legal information sessions to educate members and organizations with respect to their legal rights, responsibilities, and obligations.

¹⁰⁰ Nathalie Desrosiers (Dean, Common Law Section, University of Ottawa), phone interview by Jessica Brichta, March 26, 2015.

Conclusion

The University of Ottawa is one of Canada's top research-intensive universities. Independent assessments of Canada's medical/doctoral research universities rank it in the top 10 of Canada's top 50 research universities. The University of Ottawa is home to over 160 research chairs, including a prestigious Canada Excellence Research Chair. Between 2003 and 2013, sponsored research at the university grew by 75 per cent, rising to \$324 million. As an enterprise, the university's research activities generate significant revenues, with over \$297 million in 2013 alone.

As a research and innovation leader, the university has built an international reputation for excellence in select fields such as medicine, health, photonics, and earth sciences; and is developing its research output in new strategic areas. Its research activities attract top domestic and international talent, generate major capital investments, involve important strategic partners, identify solutions to problems that affect the lives of Canadians, and help drive provincial and national innovation agendas. The recent establishment of a Max Planck Centre at the University of Ottawa, one of only three in North America, highlights the power of strong research programs to foster international collaboration. Such activities fuel growth and prosperity in the National Capital Region and beyond.

CHAPTER 4

The University's Unique Impact Through Bilingual Education

Chapter Summary

- The University of Ottawa is the world's largest and most well-developed French–English bilingual university, with nearly 75 per cent of its undergraduate courses available in both English and French.
- The university meets its commitment to deliver French and bilingual educational services at an annual cost of \$62 million while receiving \$32 million in support grants from the provincial and federal governments for these services.
- Domestic rankings consistently place the University of Ottawa at the top among French degree-granting universities that offer medical and doctoral programs.
- Its bilingual mandate makes the university uniquely suited to meet the bilingual needs of the city of Ottawa, the National Capital Region, the province of Ontario, and the surrounding areas of western Quebec.

This chapter assesses the impact of the university’s differentiation from other large Canadian universities through regulated bilingualism. It addresses two areas: language of instruction and language of research. A third facet of bilingualism—community engagement—is discussed in the report’s case studies.

The University’s Bilingual Commitment

The University of Ottawa is the world’s largest French–English bilingual university.¹ Its model of dual offerings of courses and programs reflects a commitment to producing graduates who can contribute to the bilingual National Capital Region, in keeping with the intent of the university’s founders.² Under the statute *An Act respecting Université d’Ottawa, 1965* the University of Ottawa is mandated “to further bilingualism and biculturalism and to preserve and develop French culture in Ontario.”³

The university’s commitment includes language acquisition as a component of its educational mandate. At the University of Ottawa, students become bilingual through their learning experience; bilingualism is not a prerequisite for admission.

1 University of Ottawa, *Defy the Conventional*.

2 Arzoz, *Studies in International Minority and Group Rights*.

3 *An Act respecting Université d’Ottawa, 1965*, s. 4(c).

Domestically, the University of Ottawa consistently places in the top 10 among all universities in Canada, ranking eighth in the medical/doctoral category in the 2014 and 2015 annual Maclean's University Rankings. Among French degree-granting universities that offer medical and doctoral programs, the University of Ottawa is at the top of the Maclean's rankings, placing first in each of the past five years. (See [Table 16](#).)

Table 16
Position of University of Ottawa, Canadian Rankings, 2011–15

	2015	2014	2013	2012	2011
Maclean's— french degree granting	1	1	1	1	1
Maclean's— medical/doctoral rankings	8	8	10	10	10

Source: The Conference Board of Canada.

In Ontario, the University of Ottawa receives the largest share of public funding that supports bilingualism and official language education at the post-secondary level. For 2012–13, the University of Ottawa received over \$32 million—nearly 60 per cent of the total available funding for Ontario universities that is set aside by the federal and provincial governments in the form of bilingualism and French language support grants for institutional operations.⁴ (See [Table 17](#).)

4 Ontario Ministry of Training, Colleges and Universities, *2012–13 Operating Grants*.

Table 17

Bilingualism and French Language Support Grants, 2012–13

University	Total (\$)	Share of funding (per cent)
Ottawa	32,154,629	58.59
Laurentian	11,728,785	21.37
York	7,443,042	13.56
Hearst	2,296,617	4.18
Guelph	488,678	0.89
Toronto	450,640	0.82
Dominican	250,580	0.46
Carleton	71,860	0.13
Total	54,884,831	100.00

Source: The Conference Board of Canada.

Despite receiving the highest share of French language support grants, the University of Ottawa obtains significantly less funding to sustain French and bilingual education on a per French student basis. The university receives a 73 per cent share of university students in Ontario whose mother tongue is French—far ahead of the next closest institution, Laurentian University, with slightly less than a 10 per cent share. Yet it receives only 59 per cent of the funding available. On a per French student basis, the University of Ottawa's funding of \$3,363 per student comes well under the per-student funding provided to the two other significant, bilingual universities in the province, York and Laurentian. (See [Table 18](#).)

In order to maintain the level of French and bilingual educational services, the University of Ottawa incurs a total annual cost of \$62 million. Providing integrated and parallel English/French course offerings, bilingual library holdings, translation and publications, among other services and products, costs the University of Ottawa \$49 million

annually. An additional cost of \$13 million is incurred to assure the quality and equitable delivery of French and bilingual services targeted to address the specific needs of Franco-Ontarian students.⁵

Table 18
French Language Support Grants per French Student, 2012–13

University	French students (number)	Share of French students (per cent)	Grant per student (\$)
Ottawa	9,559	73.1	3,364
Laurentian	1,262	9.7	11,114
York	639	4.9	11,648

Source: The Conference Board of Canada.

Having formalized its regulations on bilingualism in 1974, the university has carefully monitored the balance of anglophone and francophone students and continued to make investments in bilingualism. Francophone student recruitment has been a focus of attention, as has the enrolment of anglophones who have graduated from high school French immersion programs. Recently, Canada’s push to attract more international students is presenting new opportunities to boost francophone enrolment.

The balance of francophones to anglophones enrolled at the university has remained fairly constant over the years, with francophone student enrolment unchanged at about 30 per cent of total enrolments.⁶ This number is bolstered by an additional 7 per cent of anglophone students who previously completed French immersion studies at a Canadian secondary school, and a further 4 per cent of students enrolled in French immersion studies at the University of Ottawa.⁷ While trend

5 Mercier and Diaz, *Costs and Benefits of Bilingualism at the University of Ottawa*, 2014.

6 University of Ottawa, *Destination 2020: 2014 Scorecard*.

7 Ibid.

Surveys show high levels of satisfaction with the interplay of English and French in the corridors as well as the policy allowing coursework and exams to be conducted in the official language of the student's choice.

lines show increasing overall numbers of francophone students, their ranks are being outpaced by even larger increases in the numbers of anglophone students.

Enrolment numbers only tell part of the story, of course. How students take advantage of the university's commitment to the provision of bilingual programs is another. Data show that the vast majority of anglophone students (consistently more than 95 per cent) choose to undertake programs in English.⁸ Francophone students show more interest in leveraging the bilingual mandate of the university: about 88 per cent typically study in French and 12 per cent undertake programs in English.⁹

The extent to which the university's bilingual environment—the daily mix of anglophones and francophones in all aspects of learning, work, and life—achieves the objective of bilingual education is difficult to measure. However, surveys show high levels of satisfaction with the interplay of English and French in the corridors as well as the policy allowing coursework and exams to be conducted in the official language of the student's choice.¹⁰ For undergraduates, the university offers 73 per cent of its courses in both French and English.¹¹ Although the regulatory framework for academic programs prevents the university from achieving a full 100 per cent availability of courses delivered in both languages, the University of Ottawa has set a target of 85 per cent as part of its *Destination 2020* strategic plan.¹²

8 Ibid.

9 Ibid.

10 *The Globe and Mail*, Canadian University Report. www.globecampus.ca/navigator2/university-of-ottawa/.

11 University of Ottawa, *Destination 2020: 2014 Scorecard*, 20.

12 Ibid.

The university's efforts to drive bilingualism forward have yielded strong positive results in terms of its own administration, faculty, and staff. Incentives to achieve full bilingualism have led about 70 per cent of faculty members and over 94 per cent of staff members to achieve the required level of bilingualism.¹³

Languages Used in Teaching and Learning

Students at the University of Ottawa can pursue their studies on the basis of the following four types of programs:

1. Unilingual programs: All courses are provided in only one official language, English or French.
2. Bilingual programs through parallelism: All courses are provided in both official languages.
3. Bilingual programs with a preponderance of one of the official languages: Required courses are provided in both languages, and the majority of optional courses are provided in one of the official languages.
4. Bilingual programs: Required courses are provided in one or the other official language.

Students may produce coursework and answer examination questions in the official language of their choice.

Bilingualism Within the University's Local Context

The University of Ottawa is geographically well positioned to maximize the impact of its bilingual education. Given its location in the national capital, it is able to provide a disproportionately high percentage of the future workforce of the federal government of Canada. Likewise, sitting on the border of Ontario and Quebec affords the university the

13 University of Ottawa, *Destination 2020: 2014 Scorecard*, 19.

With its position as a major bilingual educational institution, the University of Ottawa has a pivotal role to play in the future of bilingualism in the region, and importantly, in Ontario.

opportunity to draw large numbers of local students from both provinces and then produce bilingual graduates. Finally, the university's graduates obtain positions in the Ottawa–Gatineau region's many civil society organizations, where their valuable language skills enable them to better serve the local community's needs. With its position as a major bilingual educational institution, the University of Ottawa has a pivotal role to play in the future of bilingualism in the region, and importantly, in Ontario.

On September 25, 2015, after nearly four years of discussions with the Province of Ontario's Office of Francophone Affairs, the University of Ottawa received designation under the *French Language Services Act*. This legally formalized the university's commitment to bilingualism and the delivery of education and services in French.¹⁴ (The University of Ottawa Heart Institute received official designation in 2011.) Designation under the Act guarantees an individual's right to receive services in French from Government of Ontario ministries and agencies in 25 designated areas.¹⁵ The university's achievement of this designation is significant: of the 223 currently designated agencies, most are small community service organizations that can readily meet the Act's requirements of guaranteeing access to quality services in French and having representative francophone members of the Board of Directors. In contrast, much of the four-year discussion focused on resolving the implications of the Act's application to the University of Ottawa's inherently complex, decentralized, and bilingual organization.¹⁶

One challenging area for the university's commitment to bilingualism is inherent in its research function. The accelerating globalization of both discovery and applied research is driving collaboration initiatives around the common language of English. Even where graduate students and faculty members are fully bilingual, the language of advanced research, particularly in disciplines like chemistry, which is significant to the University of Ottawa, is English.

14 Ontario Ministry of Training, Colleges and Universities, *Ontario Strengthens French-Language Services at the University of Ottawa*.

15 Ontario Office of Francophone Affairs, *The French Language Services Act: An Overview*.

16 University of Ottawa, *Education and Services in French Now Protected*.

Yet, research aside, the commitment to bilingualism has positive effects in other areas. Capacity to operate in both English and French accentuates the institution's ability to diffuse economic impacts—as an employer, an enterprise operator, and a host to visitors—across both the anglophone and francophone communities in the Ottawa–Gatineau region and beyond. Certainly, as part of the university's learning impacts, the focus on bilingualism enables more students to participate in co-op placements and internships that either require bilingualism or are offered in the student's second language. Likewise, the university's consultation services and expert advice can be given in English or French or both. Finally, the university's bilingual mandate enables it to differentiate itself significantly from Ottawa's other major post-secondary institutions in terms of social and community impacts that range across cultural contributions, community development, ethnic diversification, and more.

Bilingualism in Comparison With Other Systems

The University of Ottawa's experience with bilingualism stands in contrast with that of similar institutions in other countries. Depending on the country, for example, the concept of bilingual education can become conflated with foreign language instruction, especially in countries that have a dominant official language, such as Spain.¹⁷ In the case of the University of Ottawa, however, bilingualism is supported by the fact that Canada has two official languages.

Similar to Canada, both Switzerland and Belgium's education systems serve populations where minority languages co-exist or are in close geographical proximity. Like Canada, both countries have a central government with limited involvement in higher education. Neither Switzerland nor Belgium has official bilingual education policies to cover the country as a whole. Rather, over time, various local and regional parallel systems of education have developed. Within those systems,

17 Vázquez and Gaustad, "Designing Bilingual Programmes for Higher Education in Spain."

There is virtually no comparative research undertaken on developing a typology of bilingual universities globally that could allow for relevant comparisons across various indicators.

institutions that serve their respective linguistic groups—including universities and colleges—have been established. There is limited—if any—articulation between these parallel structures.

Over the last two decades, both countries have come to look favourably upon plurilingual education at the post-secondary level. Nevertheless, for a variety of historical and political reasons, neither one has developed an education model based on full recognition of the linguistic rights of its minority populations. As a result, only isolated instances of bilingual higher education exist. In Switzerland’s case, only one university—the University of Fribourg—is fully bilingual in the manner of the University of Ottawa.¹⁸ Considerably smaller (around 10,000 total enrolments), Fribourg University has no subsidiary campus presence, nor does it provide services for minority language populations off-campus. Similarly, Belgium has no official bilingual institutions that compare with the University of Ottawa. Higher education is organized around the notion of locality or territoriality rather than linguistic footprint or minority language presence.¹⁹ For instance, the Catholic University of Leuven’s two major institutions that serve the Flemish- and French-speaking populations are fully autonomous of one another. This pattern of locality of service rather than language needs has been replicated throughout Belgium and Switzerland’s higher education systems.²⁰

A further area of enquiry that is beyond the scope of this study is how the internal characteristics of bilingual administrative structures accrue additional returns on community investment. Furthermore, there is virtually no comparative research undertaken on developing a typology of bilingual universities globally that could allow for relevant comparisons across various indicators.²¹

18 University of Fribourg, *Languages*.

19 Vogl and Hüning, “One Nation, One Language?”

20 Meyer and others, “Purilingualism, Multiculturalism and Internationalization.”

21 Xabier Arzoz, Professor, Universidad del País Vasco, EU/UHE, personal communication by Carlos Ruano, February 2, 2015.

By being responsive to the evolving nature of culture, technology, and bilingualism, the university may offer interesting opportunities to those taking advantage.

Local and Global Linkages With La Francophonie

The University of Ottawa's commitment to bilingual education has an impact in terms of connectivity with local and global francophone communities. The International Organisation of La Francophonie is the main global forum where intergovernmental cooperation takes place in support of institutional arrangements to promote cooperation among countries that have historical ties to the French language.²² A key axis of La Francophonie's work is higher education. The Association of Francophone Universities, of which the University of Ottawa is an active member, is the agency charged with promoting scientific and cultural exchanges among its members in more than 60 countries worldwide.²³ For students and faculty alike, the network reaches one of the world's biggest linguistic groups and opens up possibilities for networking and connectivity on many levels.

The university may have special appeal for individuals, families, and communities that are either fully bilingual in English and French, or for those who seek to promote bilingualism or multilingualism in general. It has publicly stated its intention to show leadership on language issues.²⁴ This leadership may attract students, researchers, and faculty who are interested in the role of language in today's increasingly multicultural society. That the University of Ottawa attracts significant numbers of francophone and bilingual students from communities across Canada and around the globe is an appealing feature to those seeking a high-quality academic experience amid a student body in tune with language issues. By being responsive to the evolving nature of culture, technology, and bilingualism, the university may offer interesting opportunities to those taking advantage.

22 Organisation Internationale de la Francophonie, *Qu'est-ce que la Francophonie?*

23 Agence Universitaire de la Francophonie, *Qu'avons-nous fait en 2014?*

24 University of Ottawa, *Destination 2020*.

Conclusion

Each year, the University of Ottawa delivers on its statutory obligations to further bilingualism, preserve and develop French culture in Ontario, and provide high-quality and equitable educational services in both official languages. At an annual cost of \$62 million—with government support of \$32 million in French and bilingual support grants to defray this amount—the university has been ranked at the top of national bilingual post-secondary institutions. In each of the past five years, the University of Ottawa has ranked first among French degree-granting universities that offer medical and doctoral programs in Canada. With a francophone student population comprising over 30 per cent—and a further 11 per cent of students entering from a French immersion program at a Canadian secondary school or enrolling in French immersion at the university—its bilingual mandate serves the Ottawa–Gatineau region, Ontario, Canada, and the world well. Indeed, with nearly 75 per cent of undergraduate course offerings available in both French and English, the University of Ottawa is an excellent model for institution-wide bilingual post-secondary education in Canada.

CHAPTER 5

Engaging Students and Impacting Local, National, and International Communities

Chapter Summary

- The University of Ottawa has a positive effect on communities through its social citizenship mandate and associated learning and community engagement activities.
- The university's Michaëlle Jean Centre for Global and Community Engagement works with more than 530 community partners in the National Capital Region and has delivered nearly 54,000 student volunteer hours through community service learning.
- The University of Ottawa attracts an increasing number of top international students, whose share of the entire student body grew from 5 per cent in 2010 to over 11 per cent in 2015.
- The university is a “neighbour” in a living city, and has a shared responsibility for its environmental footprint and overall sustainability. In comparison to 1993 levels, it has reduced water consumption by 33.6 per cent, greenhouse gas emissions by 10 per cent, and solid waste production by 42 per cent.

This chapter examines the university's performance in carrying out its student engagement and development and social citizenship mandates and in developing leadership capacity.

Engaging Students and Helping Communities

The university actively engages its students by helping them develop advanced practical skills and gain experience that prepares them for the 21st-century workplace, all while contributing to the community. It has a co-operative education program that helps its students better position themselves for success in the workplace upon graduation.

Experiential learning through co-op programs and other means is important to graduates' workplace success. The *Ontario University Graduate Survey*¹ demonstrates that University of Ottawa students are generally successful in attaining employment upon graduation. Results from the 2014 survey show that 93.5 per cent of its students self-report as being employed two years after completing their bachelor's degrees, slightly above the Ontario average of 93.0 per cent.²

Co-operative Education

Both students and employers find the idea of participating in something bigger than themselves a powerful drive in their choice of careers and/or entrepreneurial pathway. Students who participate in co-operative education programs gain critical experiential learning opportunities, develop important job skills, and are better able to assess their future career choices. With 38,295 co-op placements in its 35-year history,

- 1 "Each year, graduates of university undergraduate programs are surveyed about their success in finding work through the Ontario University Graduate Survey." in Ontario Ministry of Training, Colleges and Universities: *University Employment Outcomes, Graduation and Student Loan Default Rates*.
- 2 University of Ottawa, *MTCU Key Performance Indicators, 2014*.

From both a financial and innovation perspective, hiring the university's co-op students results in a measurable return.

the University of Ottawa has the second-largest co-operative education program in Ontario.³ Its co-op program will be instrumental in enabling the university to meet its stated strategic goal of providing an experiential learning opportunity to each undergraduate student by 2020.

Hiring co-op students also benefits employers in a variety of ways. The university's students help businesses stay abreast of recent research developments and provide fresh and innovative perspectives. Employers can evaluate these potential future employees in a cost-effective/low-risk controlled environment, and are able to gain temporary employees for special projects and peak periods. At the same time, students acquire essential workplace skills and training that will prepare them to enter into the labour market upon graduation. Furthermore, the governments of Ontario and Quebec both offer co-operative education tax credits. Additional financial support can also be obtained through the National Research Council, the Natural Sciences and Engineering Research Council of Canada, and NGO subsidies (the university's Faculty of Social Sciences).⁴ The combination of additional skills acquired by students, employer demand, and government financial incentives brings identifiable benefits to all stakeholders. From both a financial and innovation perspective, hiring the university's co-op students results in a measurable return.

The university's co-op programs are already well-established, yet additional opportunities exist for expanding their current base of employers. Many more businesses in the National Capital Region could benefit from the university's co-operative education program. A stronger sense of urgency in seeking out these partnerships would raise the university's engagement with the broader business community.⁵ By leveraging strategic partners such as Invest Ottawa to a greater extent, the university could provide its students with new co-op opportunities, especially in the technology sector.

3 Only the University of Waterloo's is larger.

4 University of Ottawa Co-operative Education Programs, *Co-op Concept and Benefits*.

5 Bruce Lazenby (President, Invest Ottawa), phone interview by Jessica Brichta, March 31, 2015.

A Social Citizenship Mandate

The University of Ottawa recognizes the importance of both experiential learning and working with community organizations to develop collaborative solutions to economic, social, and environmental issues.⁶ In addition to traditional educational experiences, the university is committed to helping its students develop a strong sense of social citizenship by honing their responsibility, leadership, and community engagement skills. Through initiatives like its Centre for Global and Community Engagement, the university encourages students to encounter new segments of the population and become involved in the communities in which they live.

Canada's top universities contain the knowledge and human capital required to address societal problems. Harnessing and mobilizing this research and human capital pool can help communities find creative solutions to critical social issues. The following case study, "Developing Social Citizenship Through the Centre for Global Engagement," illustrates some of the Centre's key impacts on students and communities, both in the National Capital Region and internationally.

Case Study 3: Developing Social Citizenship Through the Centre for Global and Community Engagement

Launched on October 21, 2011, the University of Ottawa's Michaëlle Jean Centre for Global and Community Engagement (CGCE) enhances the university's social citizenship mandate by placing lifelong community engagement and a sense of social responsibility prominently in the student learning experience.⁷ Through community placements and experiential learning opportunities that enhance academic experiences, students participate in a wide variety of volunteer opportunities that support community development and engagement at the

6 Centre for Global and Community Engagement, *Activity Report 2011–2013*.

7 Centre for Global and Community Engagement, *Home*.

In addition to promoting and instilling an ethic of service, the Centre's strategic goals include helping students develop leadership, compassion, deep values, and self-confidence.

local, national, and international level. In addition to promoting and instilling an ethic of service, the Centre's strategic goals include helping students develop leadership, compassion, deep values, and self-confidence.⁸ Examples of volunteer opportunities include the following:

- **Community Service Learning (CSL):** Through this academic program, students complete 30 hours⁹ of professor-approved experiential learning community service work related to course learning objectives, in addition to a series of related assignments. Sample community partner organizations include medical organizations, community and Aboriginal health centres, research institutes, citizen corporations, refugee and international aid organizations, campus sustainability departments, parliamentary offices, etc.¹⁰ By 2020, the university plans on providing each undergraduate student with at least one experiential learning opportunity.¹¹
- **Alternative Student Break (ASB):** Over their February study week and summer breaks, students volunteer for unique service learning placements. Using the PARE Model,¹² teams plan local or international community service projects, help secure necessary funding, and critically reflect on their accomplishments. Sample projects include zero-waste campuses, high school engagement, and international safe stoves and reforestation initiatives.¹³
- **Days of Service:** In response to direct needs identified by local community partners, teams of the university's students participate in special one-day volunteer opportunities. Community partners include organizations like the Ottawa Mission, Big Brothers and Big Sisters Ottawa, and the Ottawa Food Bank.¹⁴

8 Centre for Global and Community Engagement, *Activity Report 2011–2013*.

9 There are 30 over the fall and winter; 20 over the summer semester.

10 Centre for Global and Community Engagement, *Community Service Learning*.

11 Centre for Global and Community Engagement, *Activity Report 2011–2013*.

12 Preparation, Action, Reflection, and Evaluation; Troppe, Marie. *University of Maryland Faculty Handbook for Service-Learning*.

13 Centre for Global and Community Engagement, *Alternative Student Break Program Guide*.

14 Centre for Global and Community Engagement, *Days of Service*.

- **TD Environmental Leaders Program:** Teams of the university's students plan and implement community-based service projects in the National Capital Region that address environmental challenges. Examples of projects include protecting/improving the health of the Ottawa River, conducting Ottawa Centre EcoDistrict recycling assessments, and planting trees in local schoolyards.¹⁵

Measuring CGCE's Impacts

The CGCE is helping the university position itself as an advanced research and teaching university while also emphasizing community engagement as a core aspect of the student learning experience.¹⁶ This differentiates the university from others that do not offer their students academically structured opportunities to engage with surrounding communities. It also generates strong ties between university students and society. An important aspect of the CGCE experience includes promoting awareness and introducing students to vulnerable populations they might not otherwise encounter—an important element in the development of a strong community service ethic. For example, in the 2013–14 calendar year, 72 per cent of students engaged in community service learning (CSL) reported that their experience exposed them to unfamiliar segments of their communities. A full 76 per cent felt this experience boosted not only their community awareness, but also their role within the community.¹⁷ These experiences help students develop a broader sense of social citizenship and responsibility that extends beyond the university's boundaries. International volunteer opportunities in different countries strengthen the university's internationalization goals by connecting students and faculty professors to the broader global community.

The number of students participating in the CGCE is increasing steadily each year. (See [Chart 5](#).) Eight of the university's ten faculties (through 123 different courses)¹⁸ now collaborate with the CGCE to provide students with meaningful volunteer service and community experiences that support their academic development. The university's Faculty of Medicine requires all of its students to complete a CSL placement.

15 Centre for Global and Community Engagement, *TD Environmental Leaders Program*.

16 Centre for Global and Community Engagement, *Activity Report 2011–2013*.

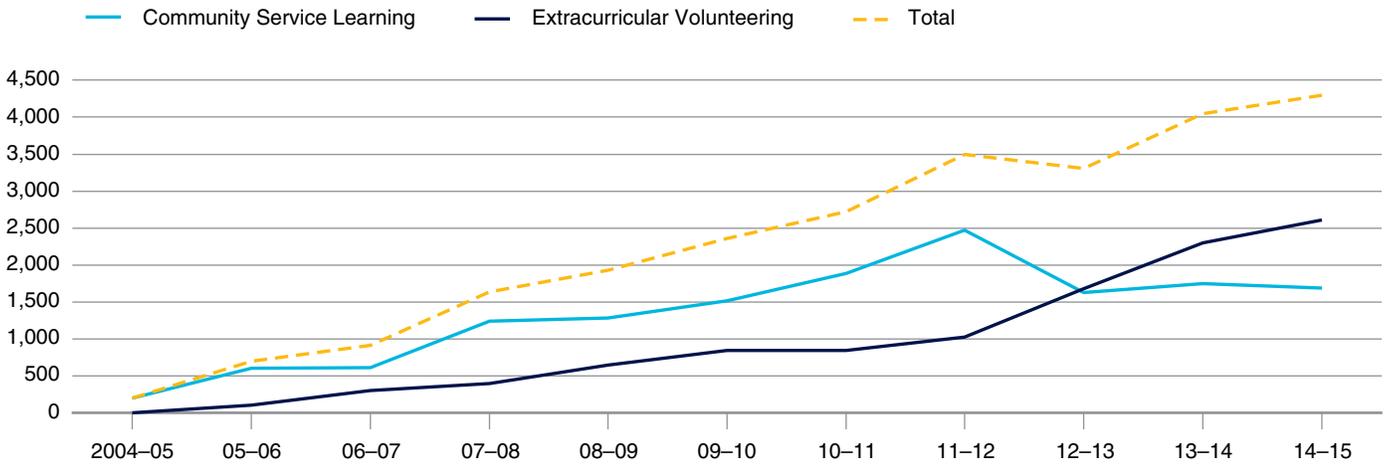
17 Centre for Global and Community Engagement, *2013–2014 Academic Year Progress Report to August 29, 2014*.

18 Ibid.

Chart 5

Students Registered With the Centre for Global and Community Engagement

(number)



Source: Centre for Global and Community Engagement.

As of August 29, 2014, 4,049 students had registered for community engagement experiences (1,748 through community service learning and 2,301 through additional extracurricular volunteer activities).¹⁹ The CSL portion alone represents more than 53,610 community volunteer hours. In the National Capital Region, the CGCE works with over 539 community partners across a broad range of fields. Many of these community partners report that students are instrumental in implementing special projects, providing new operational insights, and improving their service quality. Fifty-five per cent also report that the university’s students continued to volunteer with their organizations after completing their initial assignment.^{20,21} In addition, the CGCE supports students interested in starting their own grassroots initiatives.²²

19 Ibid.

20 Ibid.

21 Additional volunteering and subsequent employment offers are not currently tracked.

22 Centre for Global and Community Engagement, *Centre for Global and Community Engagement: Home*.

“ “ The program lets young people act and see the world from a different perspective. It gets us to believe that we can change things and suggest creative ideas to bring positive change.”²³

Israa Jomaa, RecycleMania participant

While providing community partners with critical human capital resources, knowledge, and skills,²⁴ these experiential learning opportunities help students develop their own skills and knowledge, better understand classroom concepts, apply classroom theory to real-life situations, and enhance their sense of social responsibility and awareness.²⁵ CGCE students in the fall 2014 cohort identified personal leadership skill development in areas such as motivation, organizing or directing others, setting objectives, delegating tasks, accepting responsibility, listening, supporting and giving constructive criticism, persevering, and adapting plans to changing situations. CGCE students report high satisfaction with their volunteer experiences—93, 92, and 96 per cent in the fall 2013, winter 2014, and fall 2014 semesters respectively.²⁶

“ “ This CSL learning experience gave me a great opportunity to experience my field of work. It allowed me to figure out what my strengths and weaknesses are in my interactions with patients, and I feel that my experience here at uOttawa was greatly enriched by CSL.”²⁷

Genevieve V., Psychology

23 Centre for Global and Community Engagement, *Activity Report 2011–2013*.

24 Centre for Global and Community Engagement, *Community Service Learning (CLS) Program Community Partner's Handbook*.

25 Centre for Global and Community Engagement, *Community Service Learning (CLS) Program Student's Handbook*.

26 Centre for Global and Community Engagement data.

27 Centre for Global and Community Engagement, *Activity Report 2011–2013*.

Looking to the Future

To increase the important impacts it is already having on both community members and students, the CGCE is actively seeking to raise awareness of the importance of volunteering (both for the community and for employability skill development), and to engage even more students and professors. The centre also seeks to attract more male participants (as the majority of its student volunteers—approximately 80 per cent—are female) and broaden the scope of its international volunteer placement options.

Achieving substantial increases in student and community partner involvement will also require additional investments in both financial and human capital resources to manage the outreach, placements, and partnerships. Both university and community donors will reap the benefits of these investments. Additional research on the long-term effects of these placements on skill development, career paths, and community improvement could help demonstrate the return on investment of centre placements.

Universities are uniquely positioned to disseminate the wealth of research, knowledge, and human capital they generate. Linking academic development to community engagement and social responsibility will create a new generation of citizens—a human capital pool with the skills and drive to change society for the better. The University of Ottawa's Michaëlle Jean Centre for Global and Community Engagement provides students with unique experiential learning opportunities designed to promote both academic excellence and strong social citizenship.

International Students

The University of Ottawa has an important global impact in terms of its graduation of international students. As individuals, the majority of these graduates return to their home countries where they advance their own economic potential while also enhancing the well-being of their families and communities. It can only be advantageous to Canada to have young, global talent with close connections to our country. Aside from the immediate benefits of drawing friends and visitors to Canada, these international graduates may stimulate commerce and trade.

The University of Ottawa has made significant progress toward increasing the number of enrolled international students, exceeding the ambitious targets set out in its *Destination 2020* strategic plan.

Canada has indicated an intention to increase its number of international students to 450,000 by 2020. As is the case for all universities, the University of Ottawa stands to gain by attracting higher numbers of international students. On the one hand, they tend to pay higher tuition fees, while on the other hand they increase diversity on campus and in learning activities—both valuable contributions. For its part, the University of Ottawa is offering competitive financial support to attract “the highest calibre international students.”²⁸

In this respect, the University of Ottawa has made significant progress toward increasing the number of enrolled international students, exceeding the ambitious targets set out in its *Destination 2020* strategic plan. Having set a goal of doubling the number of international graduate students (from 700 to 1,400) and increasing its international undergraduate student body by 50 per cent (from 1,500 to 2,250) by 2020—or 9 per cent of the entire student population—the university surpassed this mark in 2014.²⁹ In light of this early achievement, the university has set a new target of 15 per cent by 2020.

Ottawa–Gatineau’s Immigrant Community

According to the 2011 National Household Survey, nearly one in five Ottawa–Gatineau residents is foreign-born,³⁰ and this ratio is projected to rise to nearly one in three by 2031.³¹ As Ottawa continues to welcome more immigrants, much effort is required by various key community stakeholders to ensure that newcomers integrate socially, economically, and culturally to an adequate degree. The University of Ottawa plays an important role in this integration.

28 The University of Ottawa, *Destination 2020*.

29 Ibid.

30 Statistics Canada, *Immigration and Ethnocultural Diversity in Canada*.

31 Statistics Canada, *Projections of the Diversity of the Canadian Population*.

It launched its *Access uOttawa* program in partnership with Hire Immigrants Ottawa in 2008. Hire Immigrants Ottawa's mandate is to help employers in the Ottawa–Gatineau region effectively attract, hire, and integrate skilled immigrants into the workplace. Through the program, the university sought to increase its workplace diversity by recruiting fully qualified, job-ready, bilingual candidates from specific diversity groups.³² The university recruited skilled immigrants, including internationally trained individuals, to fill short-term positions at the university until suitable full-time roles became available. It also referred immigrants to community partners that provided various forms of employability assistance to help immigrants integrate into the Canadian workforce.³³ According to a 2010 media release, 40 candidates were given short-term job opportunities, 5 were offered permanent positions, and 70 per cent of candidates were renewed for subsequent placements.³⁴

The university continues to support workplace diversity by participating in two Hire Immigrants Ottawa working groups.³⁵ As a member of the Public Sector Working Group, and Employer Council of Champions, it collaborates with public and private sector employers, business associations, and labour groups to champion and seek solutions for the successful integration of skilled immigrants into the workforce.

The university further offers bridge-training for internationally trained nurses and collaborates with Algonquin College to offer the Practical Nurse Diploma to Bachelor of Science in Nursing Academic Pathway. The university also offers a number of bridging programs, including ones for second-language instruction. One such example is its English Intensive Program, which, upon successful completion, enables students to apply for admission to the university's mainstream undergraduate and graduate degree programs.

32 Hire Immigrants Ottawa, *University of Ottawa*.

33 Ibid.

34 University of Ottawa. The University of Ottawa among the top thirty-five best employers for new Canadians.

35 Kelly McGahey, Hire Immigrants Ottawa, Telephone conversation April 30, 2015.

The university formally recognizes that the institution is constructed on the traditional lands of the Algonquin people.

First Nations, Métis, and Inuit Students

Post-secondary education institutions have historically underserved Aboriginal peoples—First Nations, Métis, and Inuit.³⁶ To some degree, Canada's universities have taken steps toward greater inclusion of Aboriginal students, reversing past trends and removing obstacles to university education. The University of Ottawa is a part of this effort. Indeed, the university formally recognizes that the institution is constructed on the traditional lands of the Algonquin people, something many other Canadian universities do not do.³⁷

Over 30,000 individuals in the Ottawa–Gatineau census metropolitan area claim an Aboriginal identity—16,000 identified as First Nations and 12,000 as Métis.³⁸ Fewer than 1,000 revealed their Inuk identity; however, other estimates have pegged the number of Inuit closer to 3,000.³⁹ Nevertheless, Ottawa is home to the largest settlement of Inuit outside Inuit Nunagat. In response to the diverse collection of Aboriginal peoples residing in Ottawa, as well as their unique needs, the university provides a designated space on campus for its Aboriginal student population to gather for social events and obtain academic support services.

The university has developed programs that incorporate Aboriginal perspectives and subject matter. The Faculty of Arts offers undergraduate students the option to obtain a major or minor in Aboriginal studies. In addition, a focus on Aboriginal issues is available through courses delivered by the faculties of education and law.

The university has strengthened its connections with Aboriginal communities, building formal relationships with organizations representing indigenous nations. Prior to the 2009–10 academic year, the University of Ottawa and the Métis Nation of Ontario (MNO)

36 Smith and Gottheil, *Increasing Accessibility: Lessons Learned in Retaining Special Population Students in Canada, 2011*, 47.

37 University of Ottawa, *Institute of Canadian and Aboriginal Studies*.

38 Statistics Canada, *NHS Profile, OttawaGatineau, CMA, Ontario, 2011*.

39 Payne, "Ottawa's urban Inuit renaissance."

formally established a memorandum of understanding to enhance the educational outcomes of Métis in the university community. The university has established a research chair in Métis studies—currently held by Dr. Brenda Macdougall—endowed by a contribution of \$3 million from the Government of Ontario.⁴⁰

Sustainability

The carbon dioxide (CO₂) footprint from university activities such as waste management, heating, and cooling has remained constant since 1993 despite increases in both the size of the university and numbers of students. Since the early 1990s, the university has undertaken institution-wide efforts to manage, reduce, and improve its environmental footprint. As of 2012, it has attained the following results:⁴¹

- reduction of its total water consumption by 33.6 per cent from its 1993 levels;
- lowering of its greenhouse gas emissions by 10 per cent from its 1993 levels;
- production of solid waste down by 42 per cent from its 1993 levels;
- 182 faculty staff, or approximately 14 per cent of all full-time faculty, were engaged in sustainability research areas;
- 77 per cent of students do not drive to school.⁴²

The concept of mainstreaming sustainability as a whole-of-university posture is described in the Sustainable Development Committee's four C's model linking sustainability to the following areas:

- **Community:** The articulation of the university's and the surrounding areas' vision of place and its multiple points of contact between one another.

40 Council of Ontario Universities, 2010.

41 Unless otherwise stated, data for this segment come from University of Ottawa Office of Campus Sustainability Annual Report 2011–2012.

42 Hyde, "Now we can dream."

The University of Ottawa's geographic location provides a strategic engagement advantage.

- Culture: Sustainability as a way of relating to the environment, to self, and to others.
- Curriculum and Research: Academic and enquiry mandates that are inclusive to multiple types of learning experiences inside and outside the classroom as a way to foster social citizenship among students.
- Campus: Infrastructure, resource management, and their links with human activity.

Potential Impact in Good Governance

The university's media footprint is growing as it becomes more active in Ottawa's public policy arena with the planned introduction of the school of government. The new school intends to create significant new opportunities for university scholars and students to interact with policy-makers and officials at the local, regional, and global levels while engaging with the Canadian governance process and experts in public policy from around the world. The University of Ottawa's geographic location provides a strategic engagement advantage. Mere blocks from Parliament Hill, the university has direct access to the country's federal decision-makers and is close to more than 150 embassies. Its new school of government will deepen these relationships and allow the university to play an even greater role in sharing knowledge and contributing to public policy debates.

The University's Engagement in Digital Education

Post-secondary education institutions need to evolve and adapt their programs and practices in order to keep pace with the rapidly changing nature of education in the digital age.

Pedagogy is one area requiring a transformative approach. The University of Ottawa is in the early stages of increasing its use of digital platforms for use in teaching and learning. It ranks 10th among Ontario universities in terms of its online offerings, with 5 programs offered online

and some 76 courses delivered online.⁴³ This is particularly important as a means to expand the university's reach toward francophone populations in Canada and beyond.

At present, the university does not have partnership agreements with other francophone providers of educational services, such as Télévision française de l'Ontario (TFO or La Chaîne), or other mass media outlets such as local TV stations, *Le Droit* newspaper, or l'Office national du film du Canada (ONF) to deliver joint content. The university conducted an analysis of the various modalities and approaches envisaged for its online presence. As part of this analysis, the outlines of a partnership development strategy are emerging.⁴⁴ Further emphasis on developing partnerships with established providers who have mandates to provide high-quality digital educational material in both official languages will help the university build bilingual program delivery capacity quickly and enhance its reach.

Participation in the digital age also offers opportunities for leadership in the digitization process itself—of research, industry systems, government processes, etc. The University of Ottawa will benefit from efforts to assess where information technology modernization is needed and leverage opportunities to enhance delivery to students.

Conclusion

The futures of the University of Ottawa and the Ottawa–Gatineau region are entwined. The university's students are making substantial contributions to communities and businesses locally and regionally, as well as beyond. Through the university's Michaëlle Jean Centre for Global and Community Engagement, University of Ottawa students have donated nearly 54,000 volunteer hours with over 500 community partners in the National Capital Region.

43 University of Ottawa. Report of the E-Learning Working Group, 2013.

44 Ibid.

IMPACT OF THE UNIVERSITY OF OTTAWA

While the university is already contributing significantly to the social health and well-being of the National Capital Region, its reach extends beyond the local community. The University of Ottawa is rapidly becoming a top attraction for high-calibre international students. Between 2010 and 2014, the university increased the share of international students from 5 per cent of the entire student population to over 9 per cent.

The university is also a strong environmental performer. As a good neighbour, it has taken considerable action to reduce its environmental impact; in fact, it has reduced water consumption by 33.6 per cent, greenhouse gas emissions by 10 per cent, and solid waste production by 42 per cent from its 1993 levels.

CHAPTER 6

Summary of Impacts

Chapter Summary

- The University of Ottawa has a significant economic, social, community impact in the Ottawa–Gatineau CMA, throughout Ontario, and across Canada.
- The university's total economic impact is \$6.8–\$7.4 billion per year.
- Its activities contribute over \$1.5 billion annually to Canada's GDP, and generate and support more than 29,500 jobs across Canada.
- University of Ottawa graduates living in the Ottawa–Gatineau CMA earn a wage premium of \$2.3 billion in income each year, which is equivalent to 3.9 per cent of the CMA's total personal income, and pay an additional \$591 million in federal and provincial personal income taxes as a result of their degrees.
- The cumulative impact of annual research spending by the university between 1971 and 2013 contributed nearly \$2.6 billion to Ontario's GDP in 2013.
- The university's \$324-million annual research expenditures in 2013 were the third largest among Ontario universities.
- The social returns on its research spending are expected to yield \$479–\$958 million in 2015.
- The University of Ottawa plays a major role in delivering bilingual higher education in Ottawa and beyond, with an estimated annual investment of \$62 million, including \$32 million from the provincial and federal governments.

The University of Ottawa has a substantial economic, social, and community impact. Its impact is felt most profoundly locally, within the Ottawa–Gatineau CMA, but it extends further in Ontario and across Canada and, in some cases, around the world.

Economic activities associated with the University of Ottawa—its expenditures on operations, student and visitor spending, and wage premiums of graduates—generate substantial economic impacts. Over 29,500 jobs across Canada are created and sustained by the university’s economic activities; of this number, over 23,800 jobs are located in the Ottawa–Gatineau CMA, accounting for 3.5 per cent of its total employment.

The University of Ottawa is a major driver of the economy, adding more than \$1.5 billion annually to Canada’s GDP. In the local Ottawa–Gatineau CMA, it directly generates nearly \$800 million in GDP—the equivalent of \$96,000 of GDP per employee, notably higher than the average for all sectors in the CMA. Spending by non-local students and visitors to the university from outside the region generates a further \$253 million in GDP for the country.

The university’s research activities have made valuable contributions to the GDP as well as providing large, positive social spillovers. The cumulative impact of annual research spending by the University of Ottawa between 1971 and 2013 contributed nearly \$2.6 billion to Ontario’s GDP in 2013. Between 2003 and 2013, expenditures by the university on R&D rose by more than 75 per cent, reaching \$324 million, the third highest among all Ontario universities. At the same time, advancements in innovation derived from the university’s R&D efforts have brought sizeable social returns, estimated to generate a total of \$3.4–\$6.9 billion from 2015 to 2020. The social returns on its R&D activities for the year 2015 alone are expected to yield \$479–\$958 million.

The University of Ottawa is the world's largest and most well-developed French–English bilingual university.

The knowledge and skills acquired by students and graduates of the University of Ottawa contribute to higher earnings and higher productivity. The wage premium earned by the university's graduates within the Ottawa–Gatineau CMA totals \$2.3 billion in additional income each year, equivalent to 3.9 per cent of the CMA's total personal income in 2014. The expenditure of this wage premium by graduates of the University of Ottawa supports an additional 9,250 jobs in the Ottawa–Gatineau CMA—the equivalent of 1.4 per cent of regional employment.

The University of Ottawa is the world's largest and most well-developed French–English bilingual university. Among French degree-granting universities that offer medical and doctoral programs, the University of Ottawa is consistently at the top of the Maclean's University Rankings, placing first in each of the past five years.

To meet its statutory mandate to “further bilingualism and biculturalism and to preserve and develop French culture in Ontario,” the university delivers French and bilingual educational services at an annual cost of \$62 million, an amount offset by \$32 million in funding support from the provincial and federal governments. Its bilingual mandate ideally positions the university to meet the bilingual needs of the City of Ottawa, the National Capital Region, the Province of Ontario, and the surrounding areas of western Quebec.

The University of Ottawa maintains a prominent presence in the local community, reaching into the communities and social corners of the region to provide critical services and supports to neighbours and nearby residents. Through its successful Centre for Global and Community Engagement, more than 4,000 students engaged in community service and cultural activities in 2014. At the same time, students and faculty members in both law and medicine learn much from the community service they undertake, with the staunch encouragement of the university itself.

Tell us how we're doing—rate this publication.

www.conferenceboard.ca/e-Library/abstract.aspx?did=7500

APPENDIX A

Interviews

Arzoz, Xabier (Senior Lecturer of Administrative and EU Law at the University of the Basque Country, Bilbao, Spain), personal communication by Carlos Ruano, February 2, 2015.

Bradwejn, Jacques (Dean, University of Ottawa Faculty of Medicine), phone interview by Jessica Brichta, March 17, 2015.

Cardinal, Sophie (Director, Centre for Global and Community Engagement, University of Ottawa), in-person interview by Jessica Brichta and Carlos Ruano, February 17, 2015.

Davidson, Diane (Vice-President, Governance, University of Ottawa), in-person interview with Jessica Brichta and Carlos Ruano, March 5, 2015.

Desrosiers, Nathalie (Dean, Common Law Section, University of Ottawa), phone interview by Jessica Brichta, March 26, 2015.

Detellier, Christian (Vice-President, Academic and Provost, University of Ottawa), in-person interview by Jessica Brichta and Carlos Ruano, February 27, 2015.

Hafez, Mona (Community Engagement Manager, Centre for Global and Community Engagement, University of Ottawa), in-person interview by Jessica Brichta and Carlos Ruano, February 17, 2015.

Haynes, Craig (Counsel, Health Canada), phone interview with Jessica Brichta, March 3, 2015.

Hennick, Jay (Founder and Chief Executive Officer, First Service Corporation), phone interview by Jessica Brichta, March 12, 2015.

Joyal, Marc (Vice-President [Resources], University of Ottawa), in-person interview by Jessica Brichta and Carlos Ruano, February 25, 2015.

Julien, François (Dean, Telfer School of Management, University of Ottawa), phone interview with Jessica Brichta, March 3, 2015.

Kitts, Jack (President and Chief Executive Officer, The Ottawa Hospital), phone interview by Jessica Brichta and Carlos Ruano, March 2, 2015.

LaCroix, Patricia (Manager, Aboriginal Resource Centre, University of Ottawa), phone interview with Veldon Coburn, July 7, 2015.

Laguë, Claude (Dean, Faculty of Engineering, University of Ottawa), phone interview with Jessica Brichta and Carlos Ruano, March 2, 2015.

Lazenby, Bruce (President, Invest Ottawa), phone interview by Jessica Brichta, March 31, 2015.

de Melo, Louis (Vice-President, External Relations, University of Ottawa), in-person interview by Jessica Brichta and Carlos Ruano, February 25, 2015.

Lemay, Marie (President, Canada Economic Development for Quebec Regions), phone interview by Carlos Ruano, March 3, 2015.

Ritchie, Chris (Business Development Manager, Eastern and Northern Ontario Centres of Excellence), phone interview by Jessica Brichta, March 3, 2015.

Rock, Allan (President and Vice-Chancellor, University of Ottawa), in-person interview by Jessica Brichta, Diana MacKay and Carlos Ruano, March 5, 2015.

St. Pierre, Gaby (Director, Co-Op Education Programs, University of Ottawa), phone interview by Jessica Brichta, February 27, 2015.

Stewart, Duncan (Chief Executive Officer and Scientific Director, Ottawa Hospital Research Institute), phone interview with Jessica Brichta, March 11, 2015.

Wayner, Dan (Vice-President, Emerging Technologies, National Research Council), phone interview with Jessica Brichta, March 3, 2015.

APPENDIX B

Bibliography

Agence Universitaire de la Francophonie. *Qu'avons-nous fait en 2014?* AUF, 2014. www.myvirtualpaper.com/doc/agence-francophonie/auf_rapport_2014/2015020401/#6 (accessed February 10, 2015).

Arzoz, Xabier, ed. *Studies in International Minority and Group Rights: Bilingual Higher Education in the Legal Context: Group Rights, State Policies and Globalisation*. Leiden, NLD: Brill Books, 2012.

Brichta, Jessica, Michael Bloom, Caitlin Charman, Ryan Godfrey, Michael Grant, and Diana MacKay. *Fuelling the Surge: The University of Regina's Role in Saskatchewan's Growth*. Ottawa: The Conference Board of Canada, 2012.

Canada Foundation for Innovation. *About Us*. Ottawa: CFI. www.innovation.ca/en/AboutUs (accessed March 9, 2015).

Canadian Association of University Business Officers. *Financial Information of Universities and Colleges, 2012/2013*. www.caubo.ca/resources/publications/fiuc/caubo-2012-2013-financial-information-universities-and-colleges-0 (accessed May 22, 2015).

—. *Financial Information of Universities and Colleges, 2002/2003*. www.caubo.ca/sites/137.149.200.5.pilot/files/CAUBO_2002-2003_FINANCIAL_INFORMATION_OF_UNIVERSITIES_AND_COLLEGES.pdf (accessed June 18, 2015).

Centre for Global and Community Engagement. *2013–2014 Academic Year Progress Report to August 29, 2014*. Ottawa: University of Ottawa, 2014. http://servingothers.uottawa.ca/sites/servingothers.uottawa.ca/files/final_2013-2014_cgce_-_final_progress_report_en.pdf (accessed February 4, 2015).

—. *Activity Report 2011–2013*. Ottawa: University of Ottawa, 2013. http://servingothers.uottawa.ca/sites/servingothers.uottawa.ca/files/cgce2011-2013_annual_report-engweb-dec2013.pdf (accessed February 4, 2015).

—. *Alternative Student Break Program Guide*. Ottawa: University of Ottawa, 2015. http://servingothers.uottawa.ca/sites/servingothers.uottawa.ca/files/asb_program_guide_eng_accessible.pdf (accessed February 4, 2015).

—. *Community Service Learning*. Ottawa: University of Ottawa, 2015. <http://servingothers.uottawa.ca/community-service-learning> (accessed February 4, 2015).

—. *Community Service Learning (CSL) Program Community Partner's Handbook*. Ottawa: University of Ottawa, 2014. https://servingothers.uottawa.ca/sites/servingothers.uottawa.ca/files/community_partner_csl_handbook-july2014-accessible_mh.pdf (accessed February 4, 2015).

—. *Community Service Learning (CSL) Program Student's Handbook*. Ottawa: University of Ottawa, 2014. http://servingothers.uottawa.ca/sites/servingothers.uottawa.ca/files/student_csl_handbook.pdf (accessed February 4, 2015).

—. *Days of Service*. Ottawa: University of Ottawa, 2015. <https://servingothers.uottawa.ca/days-of-service>.

—. *Home*. Ottawa: University of Ottawa, 2015. <http://servingothers.uottawa.ca/> (accessed February 4, 2015).

—. *TD Environmental Leaders Program*. Ottawa: University of Ottawa, 2015. <https://servingothers.uottawa.ca/td-environmental-leaders-program> (accessed February 4, 2015).

Chan, Hera. "Indigenous Studies Program Officially Launched." *McGill Daily*, January 15, 2015. www.mcgilldaily.com/2015/01/indigenous-studies-program-officially-launched/ (accessed April 27, 2015).

Council of Ontario Universities. "New Chair in Métis Studies named at University of Ottawa." Media Releases, March 25, 2010. <http://cou.on.ca/news/media-releases/cou/new-chair-in-metis-studies-named-at-university-of-ottawa> (accessed May 26, 2015).

Coupal, Sophie. "Metal Sponges and Iron-Eating Bacteria." *Research Perspectives* (Summer 2014): 20–21. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).

Diaz, V., P. Mercier, and S. Duarte. *2012 Economic Impact Study*. Ottawa: uOttawa, 2012. www.uottawa.ca/services/irp/docs/ECONOMIC_FULL_REPORT_ENG.pdf (accessed February 3, 2015).

Ferrer, Anna M., and W. Craig Riddell. "The role of credentials in the Canadian labour market." *Canadian Journal of Economics* 35 (2003): 879–905.

Finnie, Ross. "Post-Schooling Outcomes of University Graduates: A Tax Data Linkage Approach." *EPRI Education Policy Research Initiative*, 2014.

Eggertson, Laura. "Under the Volcano." *Research Perspectives* (Summer 2014): 8–9. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).

Gardner Pinfold Consulting Economists Ltd. *Economic Impact Analysis: Dalhousie University*. Halifax: Gardner Pinfold, 2011.

—. *Export Value of Nova Scotia Universities*. Halifax: Gardner Pinfold, 2011.

Geller, Leah. "No Small Feat." *Research Perspectives* (Summer 2014): 14–15. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).

Government of Ontario. *Ontario Research Fund: Research Excellence*. Ottawa: ORF. www.ontario.ca/business-and-economy/ontario-research-fund-research-excellence (accessed March 9, 2015).

Hall, Bronwyn H., Jacques Mairesse, and Pierre Mohnen. *Measuring the Returns to R&D*. NBER Working Paper No. 15622, 2009.

Harvey Prize. *Home*. Technion City: Israel Institute of Technology. <http://harveypz.net.technion.ac.il/> (accessed March 10, 2015).

Healey, R., and K. Akerlom. *Queen's University and the Kingston Area: An Economic Partnership*. Kingston: Queen's University, 2003.

Howell, Elizabeth. "Aiming for a Quantum Leap." *Research Perspectives* (Summer 2014): 18–19. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).

Hyde, Emma. "'Now We Can Dream': University of Ottawa Reveals Master Plan." *Ottawa Citizen*, April 3, 2015. <http://ottawacitizen.com/news/local-news/now-we-can-dream-university-of-ottawa-reveals-master-plan> (accessed April 30, 2015).

Jones, Charles I., and John C. Williams. *Measuring the Social Return to R&D*. Federal Reserve Board, 1997.

KPMG Management Consulting. *Western University: Economic Impact Study Final Report*. Toronto: KPMG, 2015.

Loop, Emma. "Jeopardy! Host Alex Trebek Has Building at the University of Ottawa Named in His Honour." *Ottawa Citizen*, May 5, 2015. <http://ottawacitizen.com/news/local-news/jeopardy-host-alex-trebek-has-building-at-the-university-of-ottawa-named-in-his-honour> (accessed May 29, 2015).

Lougheed, Tim. "Getting a Good Vibe." *Research Perspectives* (Summer 2014): 6–7. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).

Mansfield, Edwin. "Academic Research and Industrial Innovation." *Research Policy* 20, no. 7 (1991): 1–12.

—. "Academic Research Underlying Industrial Innovations: Sources, Characteristics, and Financing." *Review of Economics and Statistics* 77, no. 1 (1995): 55–65.

—. "Academic Research and Industrial Innovation: An Update of Empirical Findings." *Research Policy* 26, no. 7–8 (1998): 773–76.

MarketQuest Omnifacts. *Thriving Together: Universities and Community in Atlantic Canada: A Social and Cultural Impact Study*. St. John's: MQO, 2011.

Martin, Fernand. "The Economic Impact of Canadian University R&D." *Research Policy* 27, no. 7 (November 1998): 677–87.

McMillan, Stan. *The Economic Impact of Continuing Operations of the University of Connecticut*. Storrs: University of Connecticut, 2004. http://ccea.uconn.edu/ccea_studies.htm (accessed May 20, 2015).

Mercier, Pierre, and Victoria Diaz. *Costs and Benefits of Bilingualism at the University of Ottawa*. Ottawa: University of Ottawa, 2014.

Meyer, Stephan, Petra Gekeler, Sebastian Manger, and Daniela Urank. "Plurilingualism, Multilingualism and Internationalisation in the European Higher Education Area: Challenges and Perspectives at a Swiss University." *Language Learning in Higher Education* 2, no. 2 (July 2013): 405–25.

Moranz, Alan. "Shared Dreams and Laser Beams." *Research Perspectives* (Summer 2014): 10–11. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).

Ontario Centres of Excellence. *What We Do*. Ottawa: OCI. www.oce-ontario.org/about-us (accessed March 9, 2015).

Ontario Ministry of Finance. *Ontario Population Projections: 2013–2041 Ontario and Its 49 Census Divisions*. Ottawa: Ontario Ministry of Finance, 2014. www.fin.gov.on.ca/en/economy/demographics/projections/projections2013-2041.pdf (accessed February 4, 2015).

Ontario Ministry of Training, Colleges and Universities. 2012–13 Operating Grants— Table 6: French Language Support Grants. www.ontario.ca/data/operating-grants-colleges-and-universities (accessed May 22, 2015).

—. Head Count by University and Mother Tongue Fall 12-13. www.ontario.ca/data/university-enrolment (accessed May 22, 2015).

—. Ontario Strengthens French-Language Services at the University of Ottawa. <http://news.ontario.ca/tcu/en/2015/09/ontario-strengthens-french-language-services-at-the-university-of-ottawa.html> (accessed September 25, 2015).

Ontario Office of Francophone Affairs, *Data Based on the Inclusive Definition of Francophone (IDF) From the 2011 Census*. www.ofa.gov.on.ca/en/franco-stats.html (accessed February 4, 2015).

—. *The French Language Services Act: An Overview*. Queen's Printer for Ontario, 2009–2014.

Ontario PSE Institutions. *Institutional Profiles: Co-Curricular Records/ Transcripts, May 2014 Draft*. Draft, Ontario, PSE Institutions, 2014.

Organisation Internationale de la Francophonie. *Qu'est-ce que la Francophonie?* www.francophonie.org/-qu-wat-ce-que-la-francophonie-.html (accessed February 10, 2015).

Ottawa Citizen. "UofO opens Advanced Research Complex," September 30, 2014.

Payne, Elizabeth. "Ottawa's Urban Inuit Renaissance." *Ottawa Citizen*, April 17, 2015. <http://ottawacitizen.com/news/local-news/ottawas-urban-inuit-renaissance> (accessed April 27, 2015).

PriceWaterhouseCoopers. *Regional Economic Benefits Study*. Waterloo: University of Waterloo, 2001.

—. *University of Manitoba Economic Impact Analysis*. Winnipeg: University of Manitoba, 2009.

Quacquarelli Symonds. *QS World University Rankings 2014/15*. www.topuniversities.com/university-rankings/world-university-rankings/2014 (accessed May 26, 2015).

Research Infosource Inc. *Canada's Top 50 Research Universities 2014*. Toronto: Research Infosource Inc., 2014. www.researchinfosource.com/pdf/Canada_s%20Top%2050%20research%20universities%202014.pdf (accessed February 2, 2015).

—. *Research Universities of the Year (RUY), 2014 Medical/Doctoral*. Toronto: Research Infosource Inc., 2014. www.researchinfosource.com/pdf/2014RUYMedicalDoctoral.pdf (accessed March 16, 2015).

Roy-Sole, Monique. *The Launch of uOttawa's ARC*. <https://tabaret.uottawa.ca/en/2014-09/launch-uottawas-arc> (accessed March 9, 2015).

Rushton, Sean. "Atomic Tour de Force." *Research Perspectives* (Summer 2014): 4–5. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).

Sáenz, Benjamin Alire. "Where Spanish and English Are Good for Each Other." *The Chronicle of Higher Education* 57, no 5 (September 2010): B43–44.

Salter, Ammon J., and Ben R. Martin. "The economic benefits of publicly funded basic research: a critical review". *Research Policy* 30 (2001): 509–532.

Schuur, Jeremiah, D., and John A. Michael. "A Top-Five List for Emergency Medicine: A Pilot Project to Improve the Value of Emergency Care." *JAMA Internal Medicine* 174, no. 4 (February 2014): 509–15.

Secor. *McGill University: Driving Excellence and Prosperity in Quebec*. Montréal: University of McGill, 2010.

Smith, Clayton, and Susan Gottheil. "Increasing Accessibility: Lessons Learned in Retaining Special Population Students in Canada." *College & University* 86, no. 4: 47–52.

Statistics Canada. *2011 National Household Survey: Catalogue Number 99-014-X2011036*.

—. CANSIM Table 282-0129: Labour force survey estimates (LFS), by census metropolitan area based on 2011 census boundaries, sex and age group. www5.statcan.gc.ca/cansim/a26?lang=eng&id=2820129 (accessed February 17, 2015).

—. CANSIM Table 326-0021. *Consumer Price Index*.

—. CANSIM Table 384-0015. *Provincial Gross Domestic Product (GDP), Expenditure-Based, Annual*.

—. CANSIM Table 384-0038. *Gross Domestic Product, Expenditure-Based, Provincial and Territorial, Annual*.

—. CANSIM Table 358-0001. *Gross Domestic Expenditures on Research and Development, by Science Type and by Funder and Performer Sector, Annual*.

—. *NHS Profile, Ottawa-Gatineau, CMA, Ontario, 2011*. www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E (accessed April 27, 2015).

Spears, Tom. "UofO's New Hall Named for Alex Trebek." *Ottawa Citizen*, May 2, 2015.

Strategic Mandate Agreement (2014–17), (The Ministry of Training, Colleges and Universities and University of Ottawa, April 16 and May 2, 2014).

Sudmant, Walter. *The Economic Impact of the University of British Columbia on the Greater Vancouver Regional District*. Vancouver: UBC, 2002.

The Association of Faculties of Medicine in Canada. *Canadian Medical Education Statistics 2014: Volume 36*. Ottawa: AFMC, 2014. <https://www.afmc.ca/pdf/CMES2014-Complete-Optimized.pdf> (accessed March 17, 2015).

—. *The Future of Medical Education in Canada*. Ottawa: AFMC. <https://www.afmc.ca/projects-international-future-med-can-e.php> (accessed March 17, 2015).

—. *Admission Requirements of Canadian Faculties of Medicine: Admission in 2013*. Ottawa: AFMC. https://www.afmc.ca/pdf/2013_ad_bk.pdf (accessed August 21, 2015).

The Conference Board of Canada. *Bridging the Valley*. Ottawa: The Conference Board of Canada, forthcoming.

—. *How Canada Performs: Innovation*. Ottawa: CBoC, 2014. www.conferenceboard.ca/hcp/details/innovation.aspx (accessed March 9, 2015).

—. Centre for Business Innovation: Innovation Defined. www.conferenceboard.ca/cbi/innovation.aspx

The Ottawa Hospital. *Message From the Chair of the Board and the President and CEO*. Ottawa: The Ottawa Hospital. www.worldclasscare.ca/2013/ (accessed March 17, 2015).

The Times Higher Education. *World University Rankings 2014–2015*. www.timeshighereducation.co.uk/world-university-rankings/2014-15/world-ranking (accessed February 28, 2015).

Thomson Reuters. “People’s Choice” Poll for the Nobel Prizes in the Sciences Opens. <http://thomsonreuters.com/en/press-releases/2015/september/thomson-reuters-forecasts-nobel-prize-winners.html> (accessed September 25, 2015).

Tripp Umbach. *The Economic Impact of Canada’s Faculties of Medicine and Health Science Partnerships*. Ottawa: AFMC, 2014.

—. *The Pennsylvania State University Economic Impact Statement 2008*. Pennsylvania: Pennsylvania State University, 2008.

—. *University of Iowa Economic Impact Study*. Iowa: University of Iowa, 2010.

Troppe, Marie. *University of Maryland Faculty Handbook for Service-Learning*. College Park: University of Maryland, 1999. Quoted in *Alternative Student Break Program Guide*. Ottawa: Centre for Global and Community Engagement. http://servingothers.uottawa.ca/sites/servingothers.uottawa.ca/files/asb_program_guide_eng_accessible.pdf (accessed February 4, 2015).

University of Fribourg. *Languages*. <http://studies.unifr.ch/en/organisation/langues> (accessed February 10, 2015).

University of Notre Dame. *The Economic Impact of the University of Notre Dame: South Bend, St. Joseph County and Indiana*. Indiana: University of Notre Dame, 2007.

University of Ottawa. *About the Institute*. Ottawa: University of Ottawa, 2015. www.uottawa.ca/brain/about-institute (accessed March 5, 2015).

—. *Report of the E-Learning Working Group*. Ottawa: University of Ottawa, 2013.

—. *Analyse quadrimestrielle de la visibilité médiatique de l'université d'Ottawa en 2014: Influence Communications*. Ottawa: University of Ottawa. February 2015.

—. *Brain Health Awareness Week*. Ottawa: University of Ottawa. <http://brainhealthawarenessweek.ca/> (accessed March 5, 2015).

—. *Budget 2014–2015*. Ottawa: University of Ottawa, 2014. www.uottawa.ca/financial-resources/financial-planning/sites/www.uottawa.ca.financial-resources.financial-planning/files/livredebudget.pdf (accessed February 3, 2015).

- . *Consolidated Financial Statements of University of Ottawa Year ended April 30, 2014*. www.uottawa.ca/financial-resources/financial-planning/financial-statements (accessed May 27, 2015).
- . *Defy the Conventional*. <http://defytheconventional.ca/home.php#> (accessed February 3, 2015).
- . *Desmerais Building to Mark Strong Family Ties to uOttawa*. www.uottawa.ca/media/media-release-941.html (accessed May 27, 2015).
- . *Destination 2020: The University of Ottawa's Strategic Plan*. Ottawa: University of Ottawa, 2014. www.uottawa.ca/about/sites/www.uottawa.ca.about/files/destination-2020-strategic-plan.pdf (accessed February 3, 2015).
- . *Destination 2020: 2014 Scorecard*. Ottawa: University of Ottawa, 2014. www.uottawa.ca/vice-president-academic/planning/destination-2020-and-scorecard (accessed May 27, 2015).
- . *Earth, Sun and Light: The New Advanced Research Complex*. Ottawa: University of Ottawa. www.uottawa.ca/media/media-release-3053.html (accessed March 8, 2015).
- . *Education and Services in French Now Protected*. Ottawa: University of Ottawa. www.uottawa.ca/media/media-release-3266.html (accessed September 25, 2015).
- . *Financial Aid and Awards*. Ottawa: University of Ottawa, 2014. www.registrar.uottawa.ca/Default.aspx?tabid=2654 (accessed February 17, 2015).
- . *From Humble Beginnings to Worldwide Reputation*. www.telfer.uottawa.ca/en/about-us/telfer-school-of-management-history/from-humble-beginnings-to-worldwide-reputation (accessed May 27, 2015).
- . *Institute of Canadian and Aboriginal Studies*. Ottawa: University of Ottawa. <http://arts.uottawa.ca/canada/en> (accessed April 27, 2015).

- . *MTCU Key Performance Indicators, 2014* (Ottawa: University of Ottawa, 2014). www.uottawa.ca/services/irp/docs/MTCU2014PerformanceIndicators_En.pdf (accessed September 16, 2015).
 - . *Ottawa–Shanghai Joint Medical Program a First*. Ottawa: University of Ottawa www.uottawa.ca/media/media-release-3063.html (accessed March 17, 2015).
 - . *Prowess in photonics brings third Max Planck Centre in North America to the University of Ottawa*. Ottawa: University of Ottawa www.uottawa.ca/media/media-release-3195.html (accessed September 17, 2015).
 - . *Quick Facts 2014*. Ottawa: University of Ottawa, 2014. www.uottawa.ca/about/sites/www.uottawa.ca.about/files/qf2014-en-2_000.pdf (accessed February 17, 2015).
 - . *Sneak Peek at the Advanced Research Complex*. Ottawa: University of Ottawa. www.gazette.uottawa.ca/en/2014/08/sneak-peek-at-the-advanced-research-complex/ (accessed March 9, 2015).
 - . *Standing Committee on Francophone Affairs and Official Languages: 2011–2012 Annual Report*. Ottawa: University of Ottawa. www.uottawa.ca/governance/documents/2011-2012-official-languages-annual-report.pdf (accessed March 4, 2015).
 - . *The Launch of uOttawa’s ARC*. <http://research.uottawa.ca/perspectives/launch-uottawas-arc> (accessed March 9, 2015).
 - . *U.S. Emergency Rooms Adopting Made-in-Ottawa Diagnostic Procedures*. News release, Ottawa: University of Ottawa, April 15, 2015. www.uottawa.ca/media/media-release-2960.html (accessed March 5, 2015).
- University of Ottawa Faculty of Medicine. *2011/2012 Budget Operating Fund*. Ottawa: University of Ottawa. www.med.uottawa.ca/assets/documents/2011-12-Budget-for-the-Faculty-of-Medicine.pdf (accessed March 17, 2015).

- *Affiliated Institutions*. University of Ottawa. www.med.uottawa.ca/eng/affiliated_institutions.html (accessed March 2, 2015).
- *Annual Report 2012–2013*. Ottawa: University of Ottawa. www.med.uottawa.ca/Research/assets/documents/Research-Office-Annual-Report-2012-2013.pdf (accessed March 5, 2015).
- *Canadian Academy of Clinical Biochemistry Honours Dr. Nathalie Lepage*. Ottawa: University of Ottawa. www.med.uottawa.ca/MediaCenter/eng/press_release_16sept2013.html (accessed March 5, 2015).
- *Current Research Chair Holders and Awards*. Ottawa: University of Ottawa. www.med.uottawa.ca/Research/eng/01-research_chairs.html (accessed March 17, 2015).
- *Dr. Jeremy Grimshaw Hounoured as a Fellow by Scotland's National Academy*. Ottawa: University of Ottawa. www.med.uottawa.ca/MediaCenter/eng/press_release_02march2015.html (accessed March 17, 2015).
- *Dr. Ronald Labonté Elected to the United Kingdom's Faculty of Public Health*. Ottawa: University of Ottawa. www.med.uottawa.ca/MediaCenter/eng/press_release_12March2015.html (accessed March 7, 2015).
- *Four Members of the Faculty of Medicine Appointed as Canada Research Chairs*. Ottawa: University of Ottawa. www.med.uottawa.ca/Research/eng/01-research_news.html (accessed March 5, 2015).
- *International Collaborations*. Ottawa: University of Ottawa. www.med.uottawa.ca/Research/eng/03-international_collaborations.html (accessed March 5, 2015).
- *Pediatric Team Wins International E-Learning Association Award*. Ottawa: University of Ottawa. www.med.uottawa.ca/MediaCenter/eng/press_release_07nov2013.html (accessed March 5, 2015).
- *Research Chairs*. Ottawa: University of Ottawa. www.med.uottawa.ca/Research/eng/03-research_centres.html (accessed March 17, 2015).

—. *Research Funding & Statistics*. Ottawa: University of Ottawa. www.med.uottawa.ca/Research/eng/01-research_funding_statistics.html (accessed March 5, 2015).

—. *Research Institutes*. Ottawa: University of Ottawa. www.med.uottawa.ca/Research/eng/03-research_institutes.html (accessed March 5, 2015).

University of Ottawa Gazette. *Physics Professor Wins International Prize for Ultra-Fast Light Pulses*. Ottawa: University of Ottawa. www.gazette.uottawa.ca/en/2014/04/physics-professor-wins-international-prize-for-ultra-fast-light-pulses/ (accessed March 9, 2015).

University of Ottawa Office of International Research. *The Year in Review 2013*. Ottawa: University of Ottawa. <http://research.uottawa.ca/international/sites/research.uottawa.ca.international/files/oirarpublicversion2013en.pdf> (accessed March 21, 2015).

University of Ottawa Research. *Affiliated Research Institutes*. Ottawa: University of Ottawa. <http://research.uottawa.ca/centres-institutes/affiliated-research-institutes> (accessed March 2, 2015).

—. *Awards and Recognition*. Ottawa: University of Ottawa. <http://research.uottawa.ca/about/awards-and-recognition> (accessed March 2, 2015).

—. *Networks of Centres of Excellence*. Ottawa: University of Ottawa. <http://research.uottawa.ca/centres-institutes/networks-centres-excellence> (accessed March 2, 2015).

—. *Research Chairs*. Ottawa: University of Ottawa. <http://research.uottawa.ca/chairs> (accessed March 2, 2015).

—. *Strategic Areas of Development in Research*. Ottawa: University of Ottawa. <http://research.uottawa.ca/about/strategic-areas-development> (accessed March 2, 2015).

—. *uOttawa Research Centres and Institutes*. Ottawa: University of Ottawa. <http://research.uottawa.ca/centres-institutes/uottawa-research-centres-and-institutes> (accessed March 2, 2015).

University of Toronto. *Community Impact Report 2010*. Toronto, U of T, 2010.

Vázquez, Víctor Pavón, and Martha Gaustad, "Designing Bilingual Programmes for Higher Education in Spain: Organisational, Curricular and Methodological Decisions." *International CLIL Research Journal* 2 no. 1 (2013): 82–94.

Vogl, Ulrike, and Matthias Hüning. "One Nation, One Language? The Case of Belgium." *Dutch Crossing* 34, no. 3 (November 2010): 228–47.

Williamson, Ben. "Using the Science of Light to Save Lives." *Research Perspectives* (Summer 2014): 16–17. <http://recherche.uottawa.ca/perspectives/sites/recherche.uottawa.ca.perspectives/files/2014-summer.pdf> (accessed March 9, 2015).



About The Conference Board of Canada

We are:

- The foremost independent, not-for-profit, applied research organization in Canada.
- Objective and non-partisan. We do not lobby for specific interests.
- Funded exclusively through the fees we charge for services to the private and public sectors.
- Experts in running conferences but also at conducting, publishing, and disseminating research; helping people network; developing individual leadership skills; and building organizational capacity.
- Specialists in economic trends, as well as organizational performance and public policy issues.
- Not a government department or agency, although we are often hired to provide services for all levels of government.
- Independent from, but affiliated with, The Conference Board, Inc. of New York, which serves nearly 2,000 companies in 60 nations and has offices in Brussels and Hong Kong.

Insights. Understanding. Impact.



The Conference Board
of Canada

255 Smyth Road, Ottawa ON

K1H 8M7 Canada

Tel. 613-526-3280

Fax 613-526-4857

Inquiries 1-866-711-2262

conferenceboard.ca

